Q-Logic
Drive Control System

TECHNICAL MANUAL

3.25
P4
12:08
MODE
OFF

Pride®
Mobility Products Corp.

QUANTUM®
REHAB

182 Susquehanna Avenue
Exeter, Pennsylvania 18643 USA
www.pridemobility.com

SAFETY GUIDELINES

The symbols below are used throughout this owner's manual and on the power chair to identify warnings and important information. It is very important for you to read them and understand them completely.

WARNING! Indicates a potentially hazardous condition/situation. Failure to follow designated procedures can cause either personal injury, component damage, or malfunction. On the product, this icon is represented as a black symbol on a yellow triangle with a black border.

MANDATORY! These actions should be performed as specified. Failure to perform mandatory actions can cause personal injury and/or equipment damage. On the product, this icon is represented as a white symbol on a blue dot with a white border.

PROHIBITED! These actions are prohibited. These actions should not be performed at any time or in any circumstances. Performing a prohibited action can cause personal injury and/or equipment damage. On the product, this icon is represented as a black symbol with a red circle and red slash.

NOTE: This manual is compiled from the latest specifications and product information available at the time of publication. We reserve the right to make changes as they become necessary. Any changes to our products may cause slight variations between the illustrations and explanations in this manual and the product you have purchased. The latest/current version of this manual is available on our website.

ACN **088 609 661**

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INFMANU3580/Rev B/June 2008

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I. OVERVIEW

The Quantum Q-Logic control system features outstanding versatility, smooth and responsive operation, and lively color displays. Its various input devices can be used interchangeably to meet the needs of the diverse rehab community.

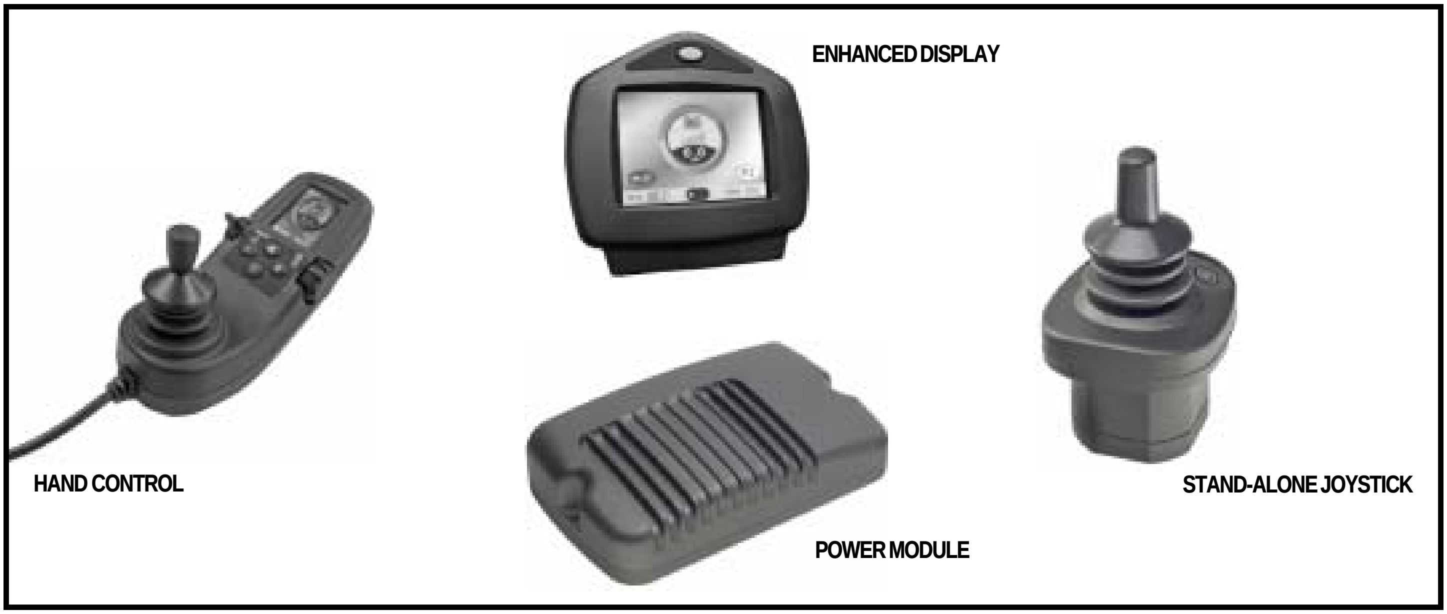


Figure 1. Q-Logic System Modules (Advanced Actuator Module, Environment Control Unit, Sip & Puff Not Shown)

Color Graphical Displays

The LCD screens on the hand control and Enhanced Display feature bright, crisp color. The displayed information includes speed, odometer, battery state of charge, and a real-time clock.

Multiple Input Device Capability

Users with fatigue or inconsistent capabilities can switch easily between input devices—simply turn off one, and turn on another.

Adjustable Features

Using a handheld programmer or PC programming station (PCPS), you can adjust a wide range of parameters. These parameters provide almost endless possibilities—not only for determining the operational feel of the chair, but also for customizing the commands the user will make to control the chair.

Q-LOGIC MODULES

The basic system is a power module and a hand control. For adjusting seat position, an AAM module is added. For users who require specialized input devices, several options are available. This is a true plug-and-play system, and modules are simply daisy-chained together.

Power Module (CTLDC1466): The power module controls the brake and drive motors and is the master of the system. This is where most information is stored, and where all input and output signals are managed.

AAM (CTLDC1472): The Advanced Actuator Module (AAM) drives five actuators that can be used to adjust the seat, back, and leg positions of the chair.

ECU (CTLDC1486): The Environment Control Unit (ECU) drives eight relays that can be used to operate devices such as mechanical page-turners and speech synthesizers.

Hand Control (CTLDC1467): The hand control is a compact, ergonomically-designed input device with a joystick, switches, speed adjustment knob, audible feedback, and a high-resolution color LCD display that continuously keeps the user well-informed.

SAJ (CTLDC1469): The Stand-alone Joystick (SAJ) is a basic no-frills input device with a joystick, switches, and various LEDs providing feedback.

Attendant Joystick (CTLDC1469): The Attendant Joystick is physically identical to the SAJ, but differently programmable. It is typically mounted on the back of the chair, for use by a walking attendant. When it is switched on, it takes over control from the user's input device.

Enhanced Display (CTLDC1471): The Enhanced Display has a high-resolution color LCD display, built-in IR for remote control, and Bluetooth compatibility. As an input device, the Enhanced Display can be operated by remote switches or a joystick. It also provides an optional display for the SAJ.

Sip & Puff (CTLDC1487): The Sip & Puff is a breath-controlled input device used together with the Enhanced Display.

Handheld Programmer (ELEASMB5215): The handheld programmer allows you to adjust the system’s many programmable parameters. It is especially convenient for fine-tuning a chair while it is being driven to suit the individual user.

PC Programming Station (ELEASMB5216): The PCPS is a software program that allows you to edit, download, and upload program files and firmware between the system and a PC.

Q-Logic's modules work together seamlessly over a bus system running a proprietary CAN protocol. During operation, all modules in the system are "awake" and participating in two-way communication.

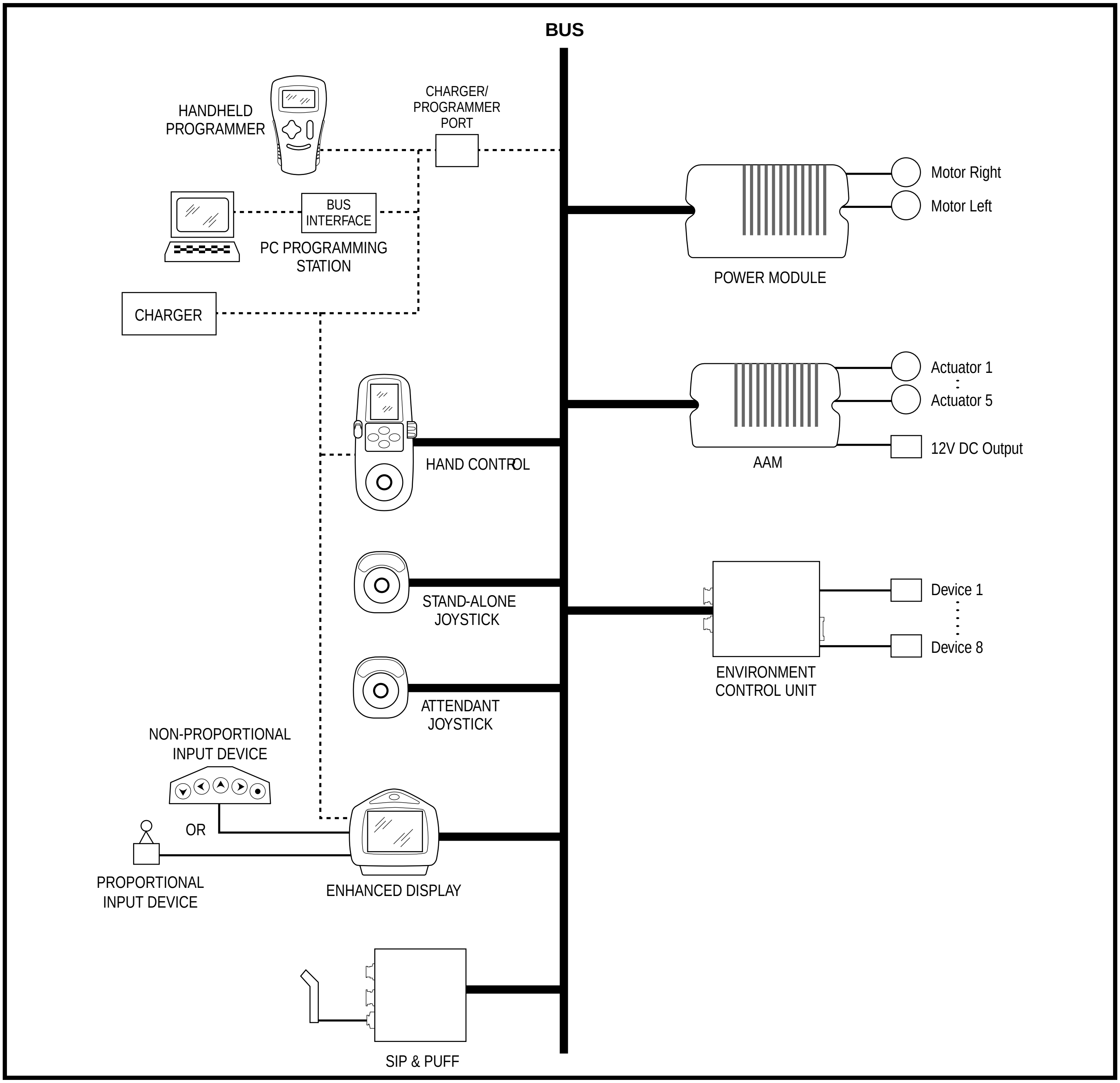

BUS
HANDHELD PROGRAMMER
CHARGER/ PROGRAMMER PORT
BUS INTERFACE
PC PROGRAMMING STATION
CHARGER
Motor Right
Motor Left
POWER MODULE
Actuator 1
Actuator 5
12V DC Output
AAM
HAND CONTROL
STAND-ALONE JOYSTICK
ATTENDANT JOYSTICK
Device 1
Device 8
ENVIRONMENT CONTROL UNIT
NON-PROPORTIONAL INPUT DEVICE
OR
PROPORTIONAL INPUT DEVICE
ENHANCED DISPLAY
SIP & PUFF

Figure 2. Q-Logic System Configuration

Easily accessible charger/programmer ports are built into the hand control and Enhanced Display; because the modules are all part of one electrical network, it doesn't matter which port you use. In addition, the power module has a 12-pin connector that can be used for an onboard charger. Programming can be done through either the handheld programmer or the PCPS.

The Q-Logic system allows you to customize the chair by adjusting a variety of programmable parameters. Before making any adjustments, you should understand some basic things about how the system works.

Who's In Charge?

In the basic configuration with only a hand control and power module, the user operates the on/off mode select lever to turn the chair on and off. In a configuration with more than one input device, the input device that powers up the chair is the one in control. The power off command can be issued from any of the input devices. To change the active input device the system must be switched off (any on/off switch) and switched on by the desired input device.

Suppose there is an Attendant Joystick in addition to the hand control, and again it is the user who powers up the chair. The Attendant Joystick is "alive," but in a passive state; its joystick would have no effect. Either the user or the attendant could power off the chair. Similarly, if the attendant powered up the chair, the hand control would be "alive" in a passive state; its joystick would have no effect. As a general rule, regardless of which input devices are connected in the system, the input device that powers up the chair is the one in control.

Turning The System Off

Using an on/off switch is the standard method for turning the system off. Two other methods are possible. If no command is given within the Auto Shutoff interval, the system will power off by itself. Or if the System Lock parameter is enabled (System Settings > Misc. menu), pressing a Mode switch for more than 5 seconds (or selecting the System Lock item in the Aux Menu) turns off the system. If the system is turned off with a Mode switch (or the System Lock item in the Aux Menu), a special procedure is required to turn it back on: activate an on/off switch, give a forward command for at least 3 seconds, then a reverse command for at least 3 seconds.

Stopping

Reducing the drive command to neutral is the standard method of stopping the chair. The chair decelerates in accordance with the programmed deceleration rates (forward, reverse, and turning deceleration rate).

There are also three special types of stop: fast stop, emergency stop, and park brake stop. You will not be able to adjust any of these special deceleration rates.

A fast stop is initiated by moving the joystick in the opposite direction for more than 50% of the active joystick range. Another way of initiating a fast stop is by releasing the joystick to center. Fast stops have a stable deceleration rate about twice that of the normal deceleration rate.

An emergency stop is initiated by a power off command while the chair is driving. The emergency stop deceleration rate is typically set to a high value.

The park brake stop is the most drastic; the motors stop abruptly with an extremely short deceleration ramp. As this stop can only be initiated by the system, it is nothing you can control or adjust.

Operating Profiles

Each input device has its own independent set of five programmable profiles. Profile 1 is always a drive profile. Profiles 2-5 can be programmed as drive, seat, or auxiliary profiles. The drive profiles define up to five different drive "feels." By selecting a seat profile, the user can adjust the position of various parts of the chair. By selecting an Aux profile, the user can access auxiliary functions available through the optional ECU and the optional Enhanced Display's IR and Bluetooth.

Input Signal Types: Drive

Input signals can be proportional or switched. A switched input drive command is simply forward, reverse, right, left-at full speed. A proportional input drive command is proportional to the amount of joystick being applied.

Programmable parameters allow any proportional input device (joystick) the option of sending a switched input command instead of a proportional input command.

It is also possible to program a proportional input device to give a "latched" drive command. This works like cruise control in a car. When the joystick is moved to the position commanding the desired speed, this speed will be maintained when the user lets go of the joystick. (If latched operation is enabled, it overrides the joystick-released-to-center method of initiating a fast stop.)

Input Signal Types: Mode

A system parameter called Mode Key Navigation (System Settings > Misc. menu) can be used to define how the Mode key (switch or button) operates. This parameter has two settings: Simple and Advanced. When set to Simple, the Mode key operates conventionally: each activation of the Mode key cycles to the next profile.

When set to Advanced, the Mode key sends two different inputs, depending on whether it is pressed briefly or held down. You will notice in several parameter descriptions the terms "mode short" and "mode long," which refer to these two signals. A long mode command toggles between the Drive profiles (taken as a group) and the Aux and Seat profiles. A short mode command cycles through the Drive profiles within the Drive group.

Standby Select: Navigating Without A Mode Key

A parameter called Standby Select (hand control, SAJ, Sip & Puff, Specialty Input >Misc. menus) can be enabled to allow the user to access all available functionality without a Mode key. Instead, the user navigates through the Standby Select menu on the LCD screen of the hand control or Enhanced Display.

The Standby Select screen displays all the configured profiles. The user navigates through this menu using the menu navigation commands appropriate for the input device. Audible feedback confirms the user's selections.

The Q-Logic system includes several input devices. The standard input device is the hand control. It is also possible to use a Stand-alone Joystick, an Attendant Control, or Non-proportional and Proportional Specialty Controls. All specialty control devices must be used together with an Enhanced Display.

PROFILES

Each input device has its own independent set of five programmable profiles. This means, for example, that the hand control's Profile 1 can be set for livelier operation than a Specialty Control Input’s Profile 1. Although theoretically there can be five different drive profiles, usually one is used for a seat profile and one for an auxiliary profile.

When the system is powered on by the same input device that was active when it was powered down, it will be in the same profile that was in effect at power off. When the system is powered on by a different input device, it will be in that device's Profile 1.

Drive Profiles

Profile 1, for each input device, is always a drive profile. Most users will want to have at least two different drive profiles: a slow one for careful maneuvering in tight spaces, and a faster one for outdoor use. The two Quick Setup parameters (Speed and Response) provide a very quick and easy way to tune the drive speed and response for each drive profile, for each device. These two parameters automatically set a group of sub-parameters that can be further fine-tuned individually if desired-but that is rarely necessary.

Seat Profile

The seat "profile" is not really a profile, but simply means the system is in Seat mode and (with the optional AAM) the user can operate the motors that adjust the position of the chair's seat, back, and legs.

AUX Profile

Similarly, selecting the Aux "profile" puts the chair in Aux mode, from which the user can control the optional ECU (and thus operate onboard page-turners, reading lights, TTS devices, etc.) as well as the Enhanced Display's IR and Bluetooth (and thus operate various electronics). Aux mode also offers a menu of other options.

DESCRIPTIONS

The input devices are described individually in the following pages.

Hand Control

The hand control is the most commonly used input device. See figure 3. The most eye-catching feature of the hand control is its display—a 2.2-in. LCD with 176×220 dot resolution, 65K color capability, and white LED backlighting. The graphics for the LCD have been carefully designed to provide easily intuited feedback information. The module also features four ergonomically designed buttons and other easy-to-use controls (on/off mode select lever, speed adjustment knob, joystick). Like the other input modules, it is the result of extensive R&D and focus group testing.

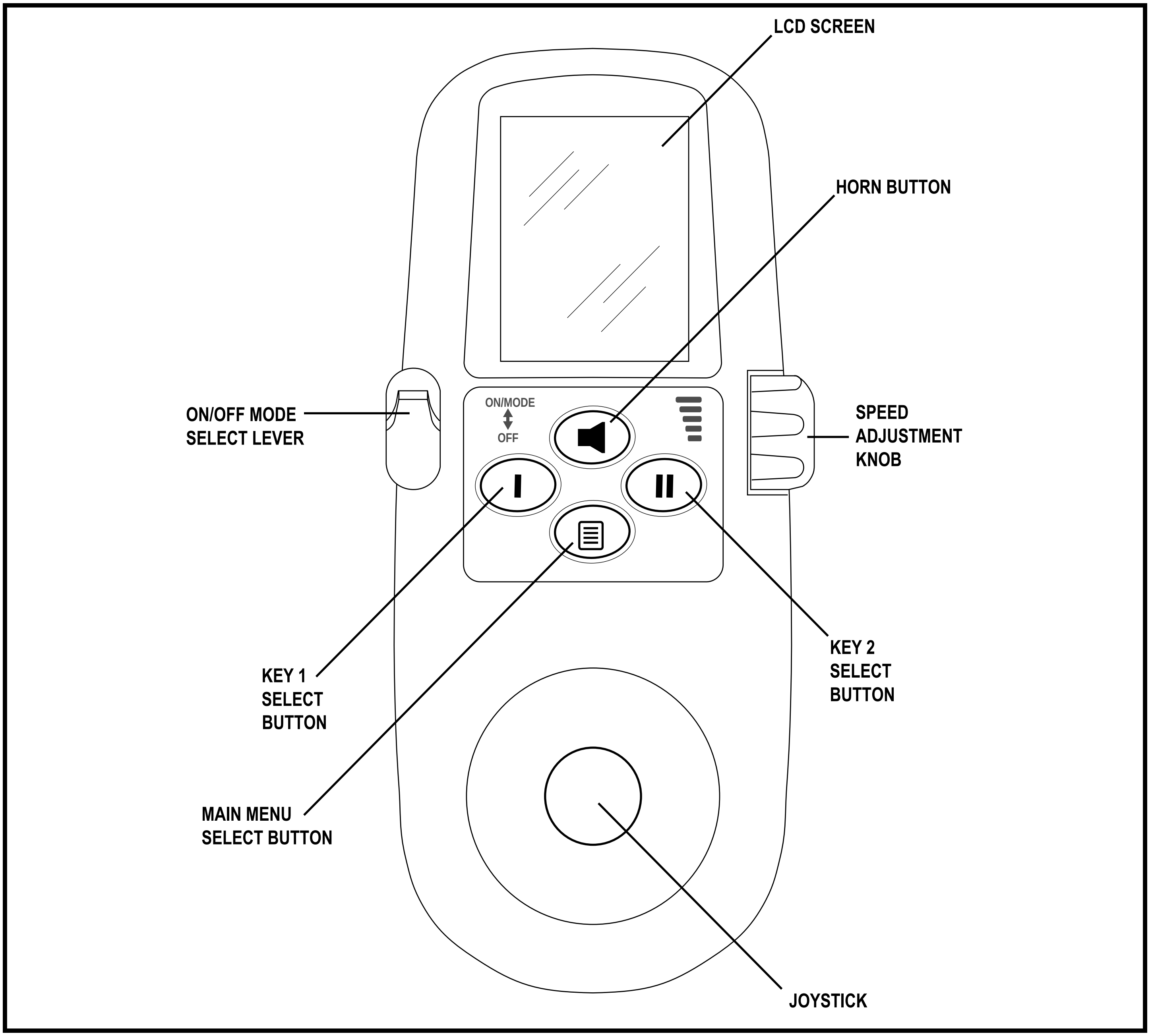

LCD SCREEN
HORN BUTTON
ON/OFF MODE SELECT LEVER
ON/MODE
OFF
SPEED ADJUSTMENT KNOB
I
II
KEY 1 SELECT BUTTON
KEY 2 SELECT BUTTON
MAIN MENU SELECT BUTTON
JOYSTICK

Figure 3. Q-Logic Hand Control

On/Off Mode Select Lever: Pressing this lever forward powers on the system. Pressing it forward again brings up the next profile. (The mode select lever is really a profile select lever.) Repeatedly pressing the lever cycles through the available profiles: P2, P3, P4, P5, P1, etc. Pulling the lever backward turns the system off.

Parallel jacks on the underside of the module allow remote On/Off and Mode switches to be installed for users who have difficulty operating the lever.

The Mode Key Navigation parameter defines whether long and short Mode signals have different meanings (see System Settings > Misc. menu).

Speed Adjustment Knob: This knob adjusts the speed potentiometer, with increasing speed in the direction of the longer printed bars and decreasing speed in the direction of the shorter bars. See figure 4. For users who cannot easily manipulate the knob in this way, you can program it for other types of motion (Hand Control > Speed Pot > Type). The requested speed pot value is displayed as a bar graph on the LCD.

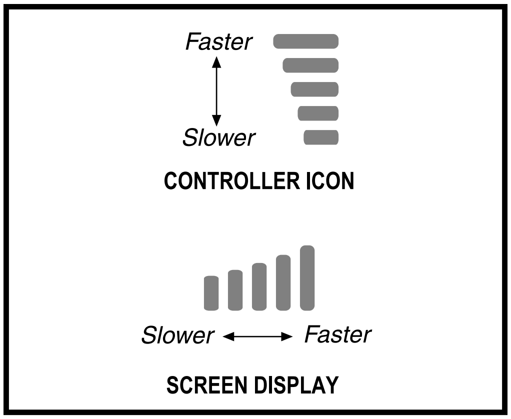


Figure 4. Speed Adjustment

Horn Button: The horn button activates a buzzer located inside the unit. The pitch of this warning sound is adjustable.

Key 1 and 2 Buttons: These two buttons provide the user with shortcuts to Drive 1 (Key 1 Button) and either the Seat or Aux menu (Key 2 Button), depending on how they are configured. For example, suppose P4 is defined as an Aux profile. If the Key 2 Button is factory-set to Aux menu, the user could use the Key 1 and 2 buttons to toggle between P1 and P4 without having to cycle through any other profiles.

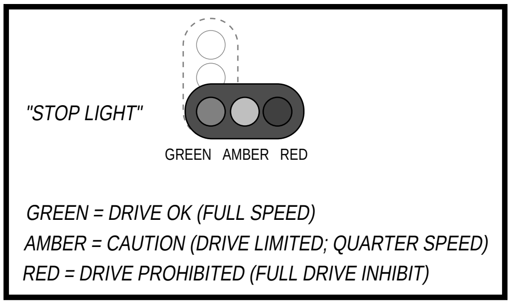

"STOP LIGHT"
GREEN AMBER RED
GREEN = DRIVE OK (FULL SPEED)
AMBER = CAUTION (DRIVE LIMITED; QUARTER SPEED)
RED = DRIVE PROHIBITED (FULL DRIVE INHIBIT)

Figure 5. LCD - Stop Light

Main Menu Button: The main menu button brings up a list of preference settings that are user adjustable: 12hr/24hr clock, miles/kilometers, English/German, etc. These settings can also be adjusted using a programmer.

Joystick: In Drive mode, the joystick is used to command direction and speed; the more it is deflected, the faster the speed. (Alternatively, it can be programmed to operate as a switch input rather than a proportional input using the Switch Operation parameter.) Maximum speed is commanded by a combination of max speed pot and max joystick.

In Seat mode, each move of the joystick to the right (or left) selects a movable component of the chair. Once the left leg, for example, has been selected, moving the joystick forward will raise the leg, and backwards will lower it. The joystick is also used to navigate through menu selections.

LCD: The display screens provide the user with easily intuited feedback information. The three circles at the lower edge of the screen represent a stoplight (green=go, amber=caution, red=stop). An amber light indicates drive operation is limited, and a red light indicates drive is prohibited.

Drive Screen (see figure 6): In this example, it is eight minutes past noon. The chair is operating in Profile 2, at 3.2 mph. The speed pot is at two-thirds max speed. The trip meter reads 31.3 miles, and the overall odometer reading is 282 miles. The battery is at 72% state of charge. The battery state of charge is shown two ways numerically inside the battery icon, and graphically as the proportion of the battery state of charge 180° arc.

Seat Screen (see figure 7): In this example, the seat and back are yellow, indicating that tilt actions are now possible. Note that the red circle in the “traffic light” is lit, which means driving is prohibited-probably because the tilt has gone beyond the allowable threshold for driving. If the user wishes to drive the chair, the chair will first need to be returned to a driveable position.

Main Menu Screen (see figure 8): This screen appears when the Main Menu button is pressed. It allows the user to set personal preferences for the time display (12hr/24hr clock), amount of backlighting, measurement system (km/miles), etc., and also to reset the tripmeter. The user can make these changes without a programmer, at any time.

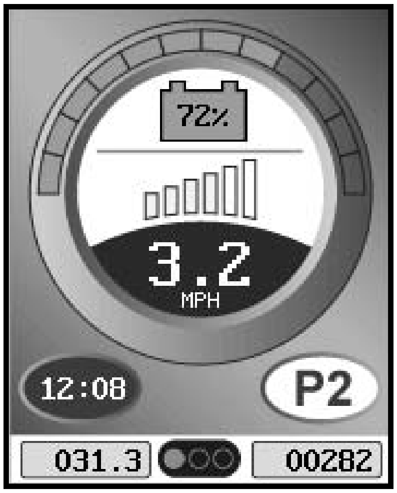


Figure 6. Drive Screen

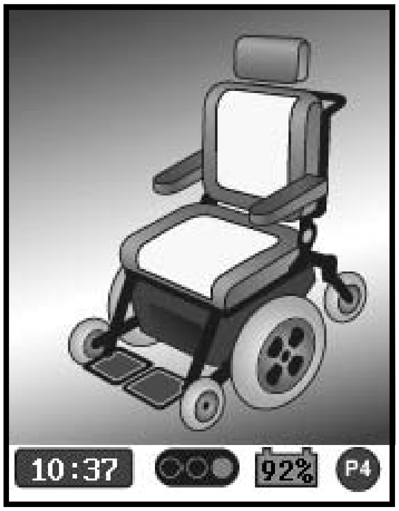


Figure 7. Seat Screen

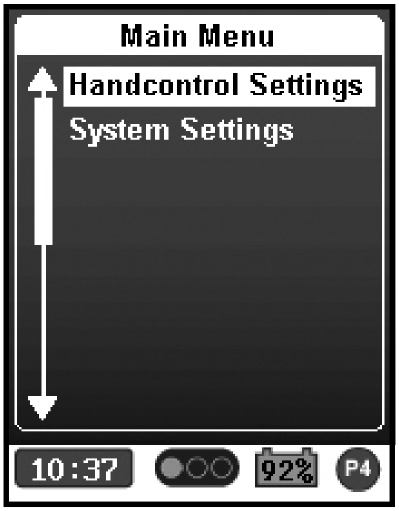


Figure 8. Main Menu Screen

Aux Menu Screen (see figure 9): The Aux screen shows the auxiliary operations that are available when operating in the Aux profile. In a standard basic system with only a hand control and a power module, typically there will be no Aux profile. In more complex systems, an Aux profile provides access to the operations made possible by the additional modules. “Aux Modes” accesses the ECU commands. In this more complex configuration, the Quick Access List holds the user's favorite commands.

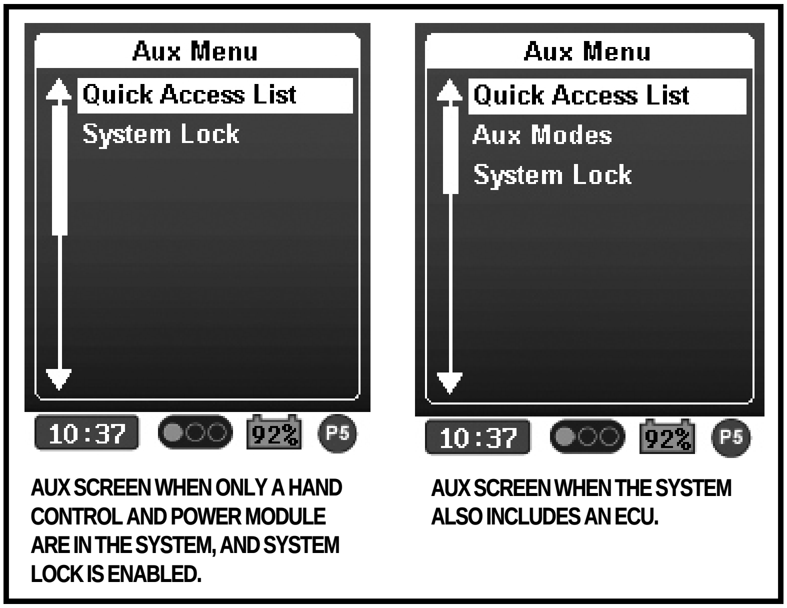
NOTE: When there is an Enhanced Display in the system, the LCD on the Hand control shows only a logo, and the LCD on the ED is used for the display-although the hand control remains the active input device.

Standby Select Screen (see figure 10): The Standby Select screen appears after the programmed timeout when Standby Select is enabled. Standby Select allows the user to navigate through the available profiles without the use of a Mode key. The profile that was active when the timeout occurred is highlighted (in this example, Seat).

Warning and Fault Indication

Fault and warning text is displayed on the LCD, along with appropriate icons, and the built-in buzzer beeps (a double beep once per minute for warnings, two beeps/second for faults). As an example of a warning message, recall that a special startup sequence is required after a System Lock power off. When the user powers up in System Lock, a message will appear on the LCD reminding the user of the required start-up sequence.

See V. “Diagnostics and Troubleshooting” for more information on warnings and faults.



AUX SCREEN WHEN ONLY A HAND CONTROL AND POWER MODULE ARE IN THE SYSTEM, AND SYSTEM LOCK IS ENABLED.

AUX SCREEN WHEN THE SYSTEM ALSO INCLUDES AN ECU.

Figure 9. AUX Menu Screens

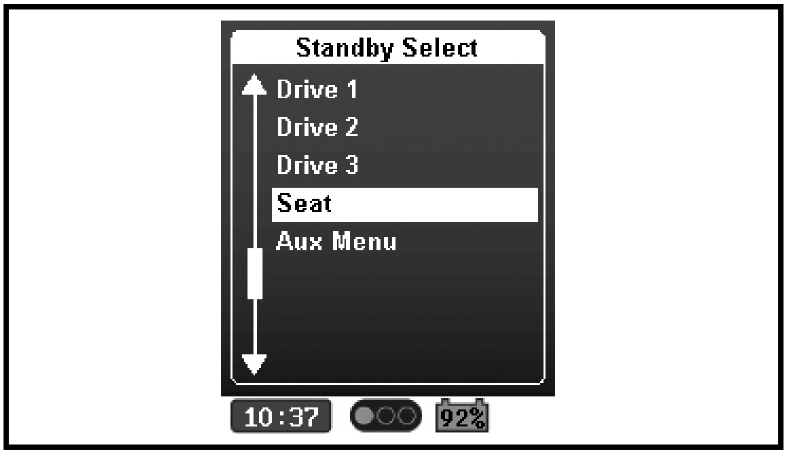


Figure 10. Standby Select Screen

Stand-alone Joystick/Attendant Joystick

This compact module doubles as a Stand-alone Joystick (SAJ) or an Attendant Joystick, depending on how it has been configured by the OEM. The tricolor Mode LED can identify only 3 drive profiles (green/amber/red), which means that unless an Enhanced Display is used your options are limited; see Mode button description below.

NOTE: When this module is an Attendant Joystick, it is limited to 3 drive profiles regardless of whether there is an Enhanced Display.

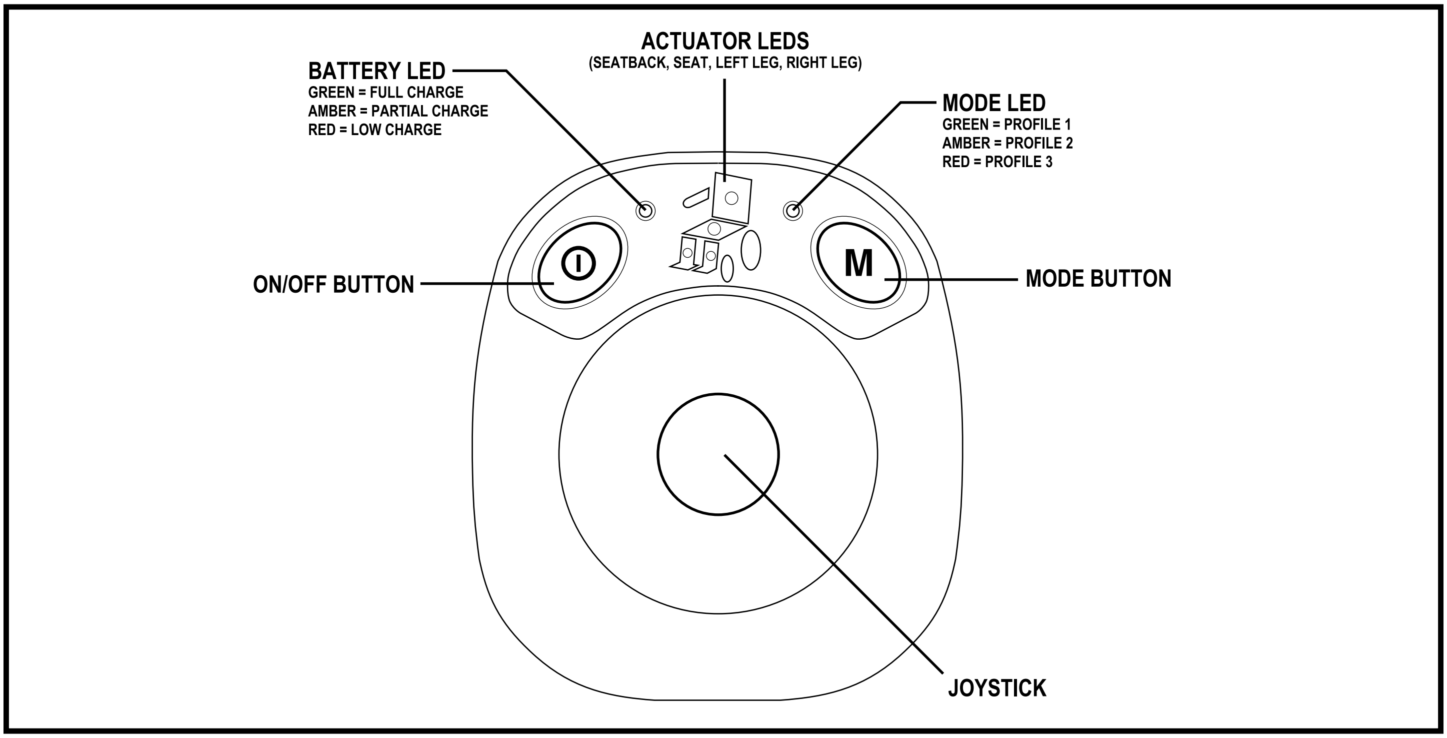

BATTERY LED
GREEN = FULL CHARGE
AMBER = PARTIAL CHARGE
RED = LOW CHARGE
ACTUATOR LEDS
(SEATBACK, SEAT, LEFT LEG, RIGHT LEG)
MODE LED
GREEN = PROFILE 1
AMBER = PROFILE 2
RED = PROFILE 3
ON/OFF BUTTON
M
MODE BUTTON
JOYSTICK

Figure 11. Stand-alone Joystick/Attendant Joystick

On/Off Button

Pressing this button powers on the system. A parallel jack on the underside of the module allows a remote On/Off switch to be installed for SAJ users who have difficulty operating the button.

Mode Button

Pressing this button selects the next higher profile. (The mode button is really a profile button.) Repeatedly pressing the button cycles through the available profiles. With no Enhanced Display in the system, you are limited to three drive profiles and a seat profile. P1, P2, and P3 can be drive profiles; but not P4. Any except P1 can be a seat profile. A parallel jack on the underside of the module allows a remote Mode switch to be installed for SAJ users who have difficulty operating the button.

The Mode Key Navigation parameter defines whether long and short Mode signals have different meanings (see System Settings > Misc. menu).

Mode LED

The color of the tricolor Mode LED indicates which profile is active. When in Seat mode, the Mode LED goes dark.

Battery LED

The color of the tricolor Battery LED indicates the battery state of charge. While battery charging is in progress, the LED sequences continuously (red/amber/green/amber/red/amber/green, etc.).

When an Enhanced Display is used with the SAJ, the Battery LED is lit to indicate that the SAJ is the active device; the other LEDs are dark.

Seat LEDs

The four LEDs in the Seat icon indicate–alone and in combination–which movements are selected.

Joystick

In Drive mode, the joystick is used to command direction and speed; the more it is deflected, the faster the speed (unless, of course, it has been programmed as a switch input). In Seat mode, each move of the joystick to the right selects a movable component of the chair; moving the joystick to the left re-selects the previous component. Once the left leg, for example, has been selected, moving the joystick forward will raise the leg, and backwards will lower it.

Warning and Fault Indication

Warnings and faults are indicated by blinking LEDs: slow blinks (2/sec.) for warnings, and fast blinks (4/sec.) for faults. Typically faults must be corrected immediately, whereas warnings are less urgent. Most error conditions can be overcome by the user taking appropriate action. When the red Battery and Mode LEDs are both blinking fast, there is an unrecoverable error and service is required. This chart shows the error codes:

Battery LED			Mode LED			Seat LEDs		Description (Remedy)
GRN	AMBER	RED	GRN	AMBER	RED	ALL	SINGLE	
*			*			*		HPD error (release drive command)
							*	Seat motor error (check wiring)
*	*	*						Controller/drive motor/brake error (check wiring)
		*						Charge drive inhibit; sequencing colors
*								High battery error
		*			*			Unrecoverable error (call technical service)

For more detail about the error condition, a programmer must be connected.

Enhanced Display Module

The Enhanced Display Module can be used to provide a graphical display for the SAJ. When used with the hand control, it provides a larger display than the hand control's display; the display on the hand control will show a static image of the Quantum logo. The Enhanced Display is mandatory with the Sip & Puff, which has no display of its own. (For parameters affecting the display, see the Enhanced Display menu.)

When a switch device or a simple joystick is used, the Enhanced Display serves as the actual input device. (For parameters, see the Alternative Controls > Specialty Input menus.)

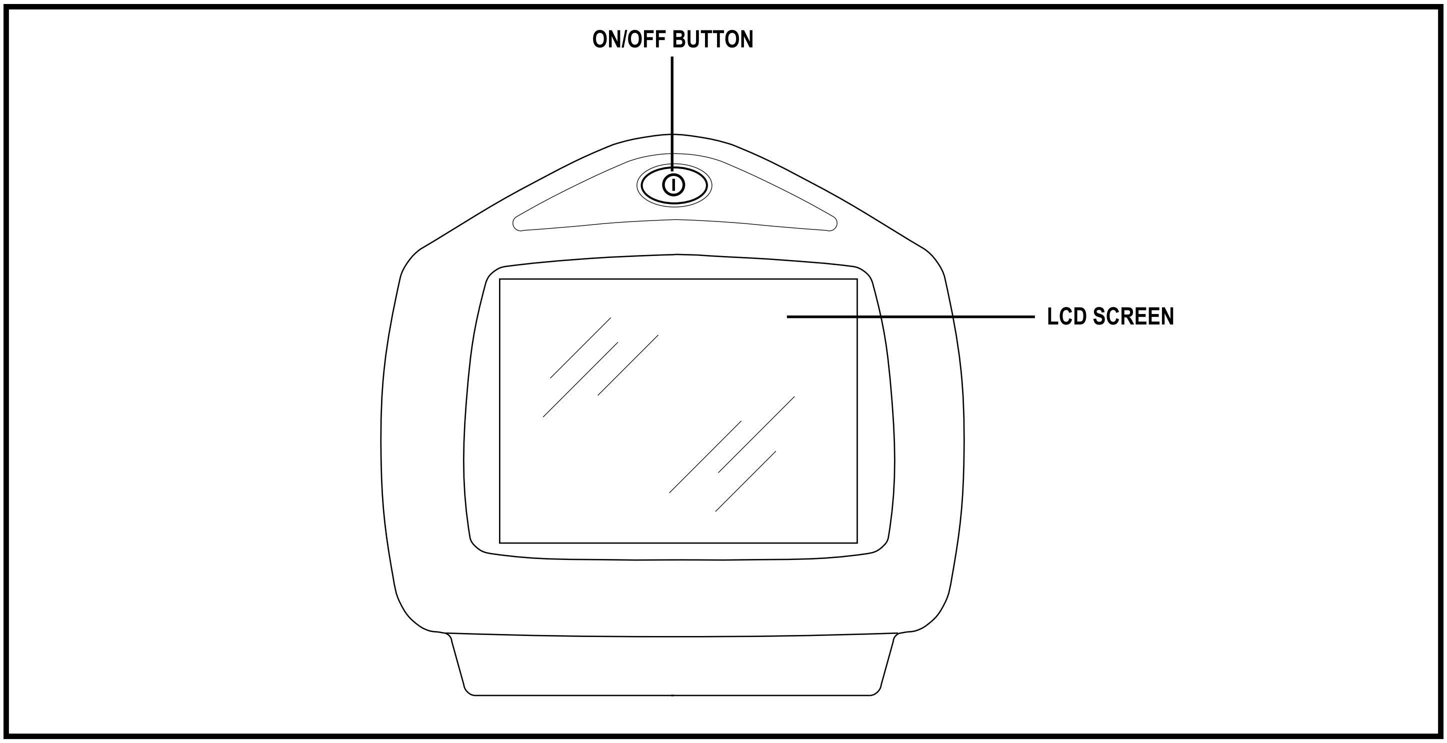


Figure 12. Enhanced Display Module

On/Off Button

Pressing this button powers on the system. Pressing it again turns the system off. When the system is powered on with this button, the system chooses the active (controlling) input device according to this order of precedence: (1) specialty input, (2) Sip & Puff, (3) hand control, (4) SAJ, (5) Attendant Joystick.

LCD

The display screens provide the user with easily intuited feedback. They are like the hand control's screens, but larger in format. When the active input device is not a hand control, the Aux menu shows two additional items: Horn and Settings; these function like the hand control's Horn and Main Menu buttons.

On/Off Jack

A parallel jack on the underside of the module allows a remote On/Off switch to be installed. With some specialty input systems, this on/off switch can be programmed as a “Smart Switch” with a short press giving a Mode command, and a long press giving an Off command.

Mode Jack

A second jack on the underside of the module allows a remote Mode switch to be installed. This additional Mode switch is optional for switch-input systems and mandatory for proportional input systems. The Mode Key Navigation parameter defines how the Mode switch operates (see System Settings > Misc. menu).

9-Pin Connector

This is where the switch device or proportional input device connects to the module. The mating connector is a 9-pin D-sub with socket contacts.

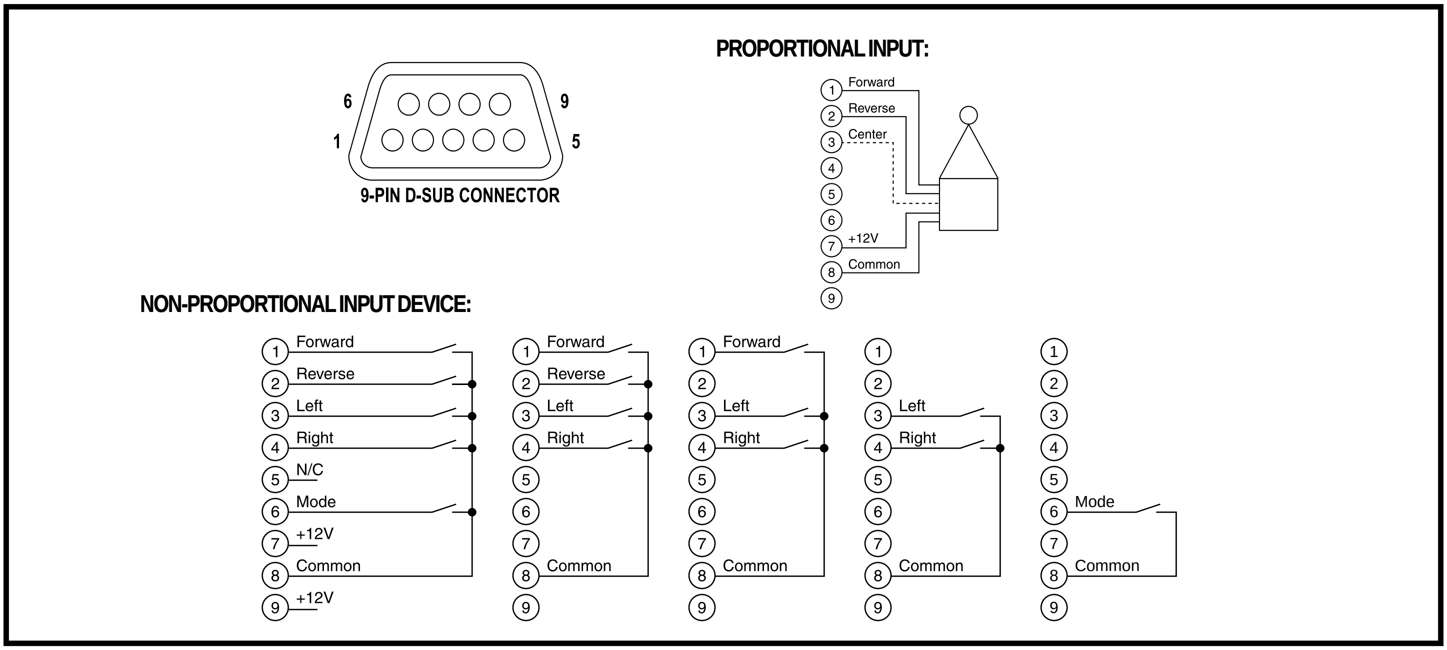

PROPORTIONAL INPUT:
6
9
1
5
9-PIN D-SUB CONNECTOR
1 Forward
2 Reverse
3 Center
4
5
6
7 +12V
8 Common
9
NON-PROPORTIONAL INPUT DEVICE:
1 Forward
2 Reverse
3 Left
4 Right
5 N/C
6 Mode
7 +12V
8 Common
9 +12V
1 Forward
2 Reverse
3 Left
4 Right
5
6
7
8 Common
9
1 Forward
2
3 Left
4 Right
5
6
7
8 Common
9
1
2
3 Left
4 Right
5
6
7
8 Common
9
1
2
3
4
5
6 Mode
7
8 Common
9

Figure 13. 9-Pin Connector

Input Type	Switches Present						
	Ⓘ	Fwd	Rev	L	R	Mode	+Mode*
4-Axis Proportional	(•)						•
3-Axis Proportional	(•)					•	•
5-Switch	(•)	•	•	•	•		(•)
4-Switch	(•)	•	•	•	•		
3-Switch	(•)	•		•	•		(•)
2-Switch	(•)			•	•		(•)
Single Switch	(•)					•	(•)

**The additional Mode switch, connected to the ED's Mode jack, is optional when shown in parentheses. In 5-switch and 1-switch configurations, its functionality is identical to that of the 9-pin's Mode switch. In 2-, 3-, and 4-switch configurations with no Mode switch connected to the jack, a double short left command generates the mode command. Alternatively, in these configurations, a Smart Switch connected to the On/Off jack can be used to generate mode commands in addition to On/Off commands.*

Mode Key Navigation and Smart Switch Parameters

The Mode Key Navigation parameter (System Settings > Misc. menu) defines how the Mode key operates. It can be set to Simple or Advanced.

When set to Simple, each activation of the Mode key cycles to the next profile. When set to Advanced, the Mode key has two functions depending on how long it is held down. A long command cycles through the drive profiles (as a group) and the non-drive profiles. A short command cycles through the profiles within the drive group.

If the switch connected to the On/Off jack is programmed to function as a Smart Switch (Enhanced Display > Misc. menu), it too will distinguish between long and short mode commands, but a long command will turn the system off, rather than cycling to the next profile group. Therefore, Mode Key Navigation must be set to Simple when a Smart Switch is used.

Switch Operation

5-, 4-, 3-, 2-, and 1-switch operation is possible; the parameter Input Setup (Alternative Controls > Specialty Input > Settings menu) defines which of these five input configurations will be used. There are many ways to configure how these switches will be operated, in order to accommodate the diverse abilities of the users. Equipment possibilities range from a 5-switch wafer board to a single switch controlled by a sensor that recognizes the user's eyelid movement.

5-switch Commands: Five-switch control (Forward, Reverse, Left, Right, Mode) requires a Mode key—either the Mode switch that is part of the wafer board (and connected to pin 6 on the 9-pin D-sub) or an external Mode switch connected to the Mode jack.

Commands are straightforward: the Forward, Reverse, Left, and Right wafers select those directions, and also navigate within menus. In the Seat menu, a Right command selects the next seat function, and Forward and Reverse correspond to up and down movement. To exit the Seat menu, use either a Left command or a Mode command. In the Aux menu, Forward and Reverse commands move to the previous and the next menu item; a Right command selects the highlighted menu item, and a Left (or Mode) command exits the Aux menu. The Mode key is used to cycle through the profiles.

4-switch Commands: Four-switch control (Forward, Reverse, Left, Right) does not use a Mode key. The Drive and Menu Navigation commands are the same as for 5-switch. Cycling through the profiles is done with a double short Left command.

3-switch Commands: With three-switch control (Forward, Left, Right), a remote Mode key is optional. Without a Mode key, cycling through the profiles is done with a double short Left command.

As there is no Reverse switch, the Forward switch is used for both directions. A short Forward command toggles between forward and reverse. A direction arrow on the Enhanced Display indicates which direction is selected. The Forward switch can then be used to drive in the indicated direction. When navigating within the Seat menu, the Right and Left commands are used to select the desired seat function; a short Forward command toggles between up and down movement, and the Forward switch can then be used to move the selected part in the indicated direction. In the Aux menu, a short Forward command toggles between previous and next, and the Forward switch can then be used to move through the menu in the selected direction. The Right command is used to select items and the Left command to exit.

Head Array: The head array uses a slightly different three-switch configuration (Back, Right, Left), with a Back (center) switch replacing the forward switch. In addition, either a Mode switch must be connected to the Mode jack or the parameter Standby Select must be enabled. If Standby Select is enabled in lieu of a Mode switch, the Standby Seat Timeout and Standby Aux Timeout parameters must also be enabled.

When the chair is in a tilted position, the user cannot avoid pressing on the Back switch of the head array. The Back switch is therefore made inactive when the chair is tilted and the system becomes a two-switch system.

Forward/Reverse
Untilted: Forward and reverse are selected by toggling the Back switch. The Back switch is then used to drive in the selected direction.
Tilted: Forward and reverse are selected by toggling the Right switch, which then is used to drive in the selected direction.

Left/Right
Untilted: Left and right are selected with the Left and Right switches; the Back switch is used to turn in the selected direction.
Tilted: Left and right are selected by toggling the Left switch, which then is used to turn in the selected direction.

Seat
The seat commands are the same, regardless of the seat tilt. This is to avoid a change of command structure when the chair moves across the tilt threshold. Therefore, with a head array the seat menu is a two-switch structure. Left commands cycle to the next seat function. A Right command toggles between up and down, and then moves the selected chair part in the selected direction.

Aux
Untilted: The commands for Previous/Next/Escape/Select are the same as for Forward/Reverse/Left/Right.
Tilted: Previous and Escape commands are not possible; the menu can only be scrolled in one direction, with the Left switch used for Next. The Right switch is used for Select.

2-switch Commands: With two-switch control (Left, Right), a remote Mode key is optional. Without a Mode key, cycling through the profiles can be done with a double short Left command.

To drive forward, the user gives a short Right command followed by a long Right command; to drive in reverse, the user gives a short Left command followed by a long Left command. Single Left and Right commands are used to make turns.

To navigate within a menu, a short plus a long Right command highlights the previous menu item, and a short plus a long Left command highlights the next item. A short Left command is used for escape, and a short Right command for select.

1-switch Commands: With a single switch control system, the available menu choices are displayed in a continuous cycle on the LCD. When the desired option is highlighted in its turn, the user activates the single switch to select that option. The single switch can be connected either to the Mode jack or to pin 6 of the 9-pin D-sub connector. Two predefined routines (4-direction and 8-direction) are available for the drive options:

4-direction routine: (1) Forward, (2) Left, (3) Reverse, (4) Right, ( ) Mode, (1) Forward...
8-direction routine: (1) Forward, (2) Slight Left Turn Forward, (3) Left, (4) Slight Left Turn Reverse, ( )Mode, (5) Reverse, (6) Slight Right Turn Reverse, (7) Right, (8) Slight Right Turn Forward, ( )Mode, (1) Forward...

Selecting Mode brings up the next profile.

In Seat mode, all the available motions are shown in sequence: left leg up, left leg down, etc.

Similarly in Aux mode, all the available options are shown in sequence.

The speed at which the menu cycles can be adjusted using the Scan Rate parameter (Alternative Controls > Specialty Input > Switched Input Settings menu).

A Smart Switch, connected to the On/Off jack, can be used for the single switch if the forward, reverse, and turn Latch parameters (Alternative Controls > Specialty Input > Drive menu) are programmed On. In unlatched operation, a continuous long Mode command is used to drive the chair. In latched operation, the long Mode command is not needed for drive and therefore a Smart Switch can be enabled (Enhanced Display > Misc. menu). With a Smart Switch, the long Mode command turns the system off.

Proportional Input Operation

Four-axis and 3-axis joystick operation are both possible. In both cases a Mode switch is required, to switch between profiles. The parameter Input Setup is set to "proportional" when a proportional input is used.

A 4-axis joystick provides proportional control in each of the four directions. A 3-axis joystick enables a user who has difficulty making pulling motions to nevertheless command four directions. Forward and reverse share the same joystick position, and the user toggles between them. An arrow on the LCD indicates whether forward or reverse is active. The programmable parameters for the proportional input are located in IV. “Programming Parameters: Alternative Controls Parameters - Enhanced Display” (Alternative Controls > Specialty Input > Proportional Input Settings menu).

Warning and Fault Indication

Fault and warning messages are displayed on the Enhanced Display's LCD just as on the hand control's LCD, and the buzzer sounds alerts just like those sounded by the hand control's buzzer.

HANDHELD PROGRAMMER OPERATION

The Q-logic handheld programmer is used for special applications and to adjust the driving parameters of the power chair.

WARNING! The controller program can affect speed, acceleration, deceleration, dynamic stability, and braking. If it is programmed incorrectly or outside of the safe limits as determined by a healthcare professional, it can create a dangerous situation. Only the power chair manufacturer, an authorized representative of the manufacturer, or a trained service technician should program the controller.

Cable with Connector

Can be connected to the front charger port of the hand control or to any other charger port in the system.

Navigation Key

The navigation key moves the screen cursor up or down (top or bottom arrow), and opens or closes subsets of parameters (left and right arrows).

Value Up/Down Key

The value up / down key changes the value of the parameter indicated by the cursor (no need for separate save function).

Bookmark Key

The three bookmark keys allow you to quickly go back to your selected parameters without having to scroll up and down the screen. Hold a Bookmark Key down for three seconds to bookmark the displayed screen. Press momentarily to jump to the previously bookmarked screen.

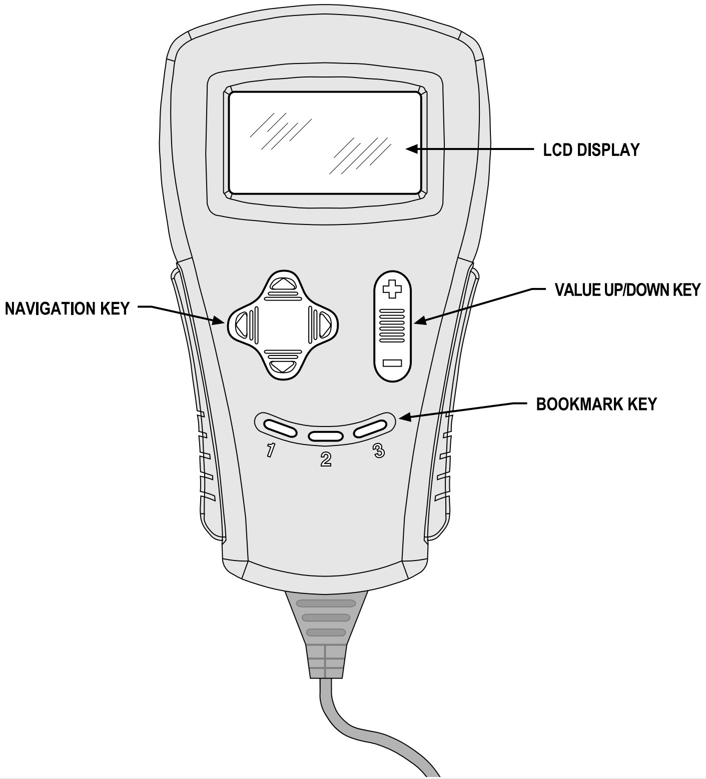


Figure 14. Q-Logic Handheld Programmer

Programmer Operation:

1. Turn the power chair on.
2. Connect the cable/connector to the hand control or any free connector. The display screen will activate shortly.
3. To open the Program Menu, press the right arrow on the Navigation Key on the programmer.
4. Use the Navigation Key (top and bottom arrows) to scroll up or down the listing of the parameters.

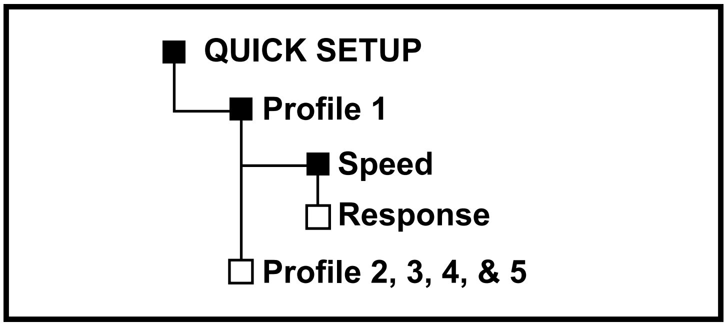


Figure 15. Quick Setup Menu

NOTE: To avoid a long scrolling time, the different parameters have been arranged into subset menus (like the files on a computer). For example, to open the Hand Control Quick Setup menu bring the cursor down to its parameter (down arrow) and then press the right arrow.

5. Open the Quick Setup Mode to be modified in the same way (either Drive Mode 1, 2, 3, 4, or 5).
6. Scroll down to the parameter you wish to change.
7. Press either the Value Up (+) or Value Down (-) key for the preferred setting, or you can press the right arrow key to show a full screen bar graph with min/max values, then press Up(+)/Down(-) to change the value.

NOTE: There is no need to press any "set key" as the programmer will automatically recognize the new value selected. If changes are made that the user needs to be aware of before continuing to drive the chair, the programmer will place the unit into an idle mode. This requires the power be turned off, then back on.

8. To close a menu, press the Left Arrow on the Navigation Pad. This will close the menu selections open.
9. Disconnect the programmer at anytime, but be aware that any bookmarks set will be lost.

IV. PROGRAMMING PARAMETERS

Programming Menu:

- ☐ **Hand Control**
  - ☐ **Quick Setup**
  - ☐ **Drive**
  - ☐ **Joystick**
  - ☐ **Sound and Display**
  - ☐ **Speed Pot**
  - ☐ **Miscellaneous**

- ☐ **Alternative Controls**
  - ☐ **Stand-alone or Attendant**
    - ☐ **Quick Setup**
    - ☐ **Drive**
    - ☐ **Joystick**
    - ☐ **Miscellaneous**
  - ☐ **Specialty Input**
    - ☐ **Quick Setup**
    - ☐ **Drive**
    - ☐ **Settings**
    - ☐ **Miscellaneous**
  - ☐ **Sip & Puff**
    - ☐ **Quick Setup**
    - ☐ **Drive**
    - ☐ **Settings**
    - ☐ **Miscellaneous**

- ☐ **System Settings**
  - ☐ **General Drive**
  - ☐ **Reverse Beep**
  - ☐ **Reminder**
  - ☐ **Timing**
  - ☐ **Motors & Wheels**
  - ☐ **Battery**
  - ☐ **Reset Distance**
  - ☐ **Miscellaneous**
  - ☐ **Programmer setup**

- ☐ **Seat**
  - ☐ **Actuators**
  - ☐ **Tilt Sensing**
  - ☐ **Miscellaneous**

- ☐ **Enhanced Display**
  - ☐ **Sound and Display**
  - ☐ **Mouse**
  - ☐ **Remote Control**
  - ☐ **Miscellaneous**

- ☐ **Diagnostics**
  - ☐ **Actual Faults**
  - ☐ **Fault History**
  - ☐ **Monitor**
  - ☐ **Information**

- ☐ **Program Data Handling**
  - ☐ **Restore OEM Settings**

HAND CONTROL PARAMETERS:

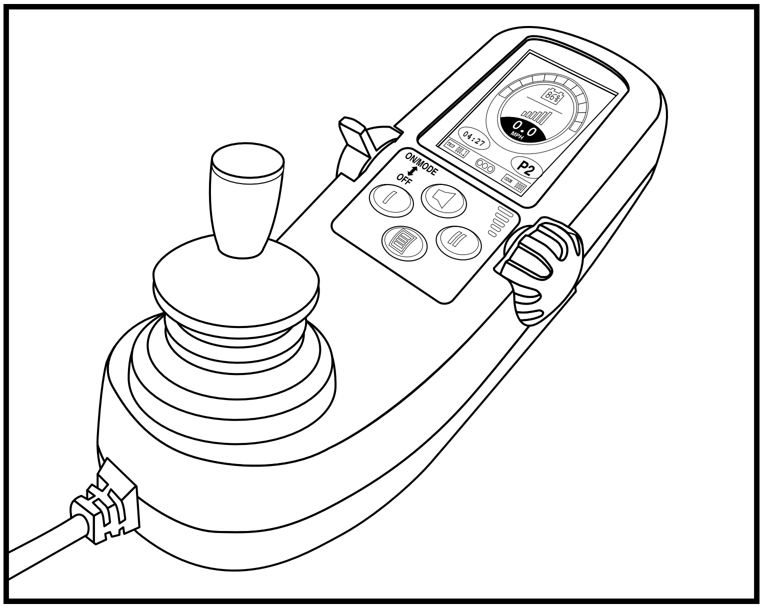


Figure 16. Q-Logic Hand Control

☐ Quick Setup

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Speed** parameter allows a quick and rough setup of the current drive profile. This parameter changes all speed parameters like forward speed, reverse speed, and turn speed to a predefined value. Select a desired speed setting for the actual drive profile.

❍ The settings for this parameter range from **1** to **5**.

“1” is the slowest speed setting, suitable for indoor use, while “5” is the fastest predefined speed setting, specifically intended for outdoor use.

Use the individual speed parameters after setting the Quick Setup Parameter for further fine tuning.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

	P1	**P2**	**P3**	**P4**	**P5**
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Response** parameter allows a quick and rough setup of the current drive profile. This parameter changes all response related parameters like forward/reverse/turn accel and forward/reverse/turn decel to a predefined value. Select a desired response setting for the actual drive profile.

- The values for this parameter range from **1** to **5**.

“1” is the smoothest response setting, suitable for very slow indoor movements, while “5” is the most responsive predefined response setting, specifically intended for outdoor use.

Use the individual Accel/Decel parameters after setting the Quick Setup Parameter for further fine tuning.

WARNING! Ensure that the user can safely operate the power chair at the selected response!

	P1	**P2**	**P3**	**P4**	**P5**
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Mode** parameter determines what operation is chosen for that particular profile. The operation can be Drive, Seat, Aux, or Disabled.

NOTE: Profile 1 will always be a drive profile and cannot be changed.

DRIVE

- ☐ **Profile 1,2,3,4, & 5**
  - ☐ **Forward Speed Min**
  - ☐ **Forward Speed**
  - ☐ **Reverse Speed Min**
  - ☐ **Reverse Speed**
  - ☐ **Turn Speed Min**
  - ☐ **Turn Speed**
  - ☐ **Speed Turn Rate Min**
  - ☐ **Speed Turn Rate**
  - ☐ **Forward Accel Min**
  - ☐ **Forward Accel**
  - ☐ **Forward Decel Min**
  - ☐ **Forward Decel**
  - ☐ **Reverse Accel Min**
  - ☐ **Reverse Accel**
  - ☐ **Reverse Decel Min**
  - ☐ **Reverse Decel**
  - ☐ **Turn Accel Min**
  - ☐ **Turn Accel**
  - ☐ **Turn Decel Min**
  - ☐ **Turn Decel**
  - ☐ **Turn Sensitivity**
  - ☐ **Latch Forward**
  - ☐ **Latch Reverse**
  - ☐ **Power**

–Forward Speed Min: The forward speed min parameter defines the minimum forward speed of the power chair when the speed potentiometer is at its minimum position and when giving a forward input greater than the center deadband, but not less.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Speed: The forward speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full forward input. When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed Min: The reverse speed min parameter defines the minimum reverse speed of the power chair when the speed potentiometer is at its minimum position and when giving a reverse input greater than the center deadband, but not less.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed: The reverse speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full reverse input. When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed Min: The turn speed min parameter defines the minimum turn speed of the power chair when the speed potentiometer is at its minimum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed: The turn speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full left or right input. When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate Min: The speed turn rate min parameter defines the highest turn speed of the power chair when the speed potentiometer is at its minimum position amd when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate: The speed turn rate parameter defines the highest turn speed for the power chair when the speed potentiometer is at its maximum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Acceleration Min: The forward acceleration min parameter sets the minimum forward acceleration speed of the power chair when the speed potentiometer is at its minimum position and when giving a forward input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Acceleration: The forward acceleration parameter sets the forward acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances. When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Deceleration Min: The forward deceleration min parameter sets the minimum forward deceleration speed of the power chair when the speed potentiometer is at its minimum position and when releasing the joystick to the neutral or center position.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Forward Deceleration: The forward deceleration parameter sets the forward deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances. When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Acceleration Min: The reverse acceleration min parameter sets the minimum reverse acceleration speed of the power chair when the speed potentiometer is at its minimum position and when giving a reverse input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Acceleration: The reverse acceleration parameter sets the reverse acceleration speed of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances. When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Deceleration Min: The reverse deceleration min parameter sets the minimum reverse deceleration of the power chair when the speed potentiometer is at its minimum position and when releasing the joystick to the neutral or center position.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Deceleration: The reverse deceleration parameter sets the minimum reverse deceleration of the power chair when the speed potentiometer is at its minimum position and when releasing the joystick to the neutral or center position.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Acceleration Min: The turn acceleration min parameter sets the minimum turn acceleration of the power chair when the speed potentiometer is at its minimum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Acceleration: The turn acceleration parameter sets the turning acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning acceleration time and a faster direction response. High turn acceleration values provide abrupt direction changes and should only be used under special circumstances. When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Deceleration Min: The turn deceleration min parameter sets the minimum turn deceleration of the power chair when the speed potentiometer is at its minimum position and when releasing the joystick to the neutral or center position.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Deceleration: The turn deceleration parameter sets the turning deceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning deceleration time and a faster direction response. High turn deceleration values provide abrupt direction changes and should only be used under special circumstances. When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Sensitivity: The turn sensitivity parameter defines the sensitivity of turns when moving the joystick in the left and right direction. A higher value represents a stronger reaction when giving steering commands.

- The settings for this parameter range from **0%—100%**.

–Latch Forward/Reverse: When the latch forward/reverse parameter is set to CRUISE, the power chair will accelerate as long as the input device is operated. When the input device is released, the power chair will continue to drive at that particular speed. If deceleration is required, the input device has to be given an opposite command less than 50% or a mode command.

When the latch forward/reverse parameter is set to STEPPED, a short command of the input device operation greater than 50% will accelerate the chair to 33% of the maximum speed setting and the drive will continue after the input device is released. Additional short commands of the input device will accelerate to 66% and 100%. If deceleration is required, a short opposite command of the input device greater than 50% has to be given. A stop can be executed by giving a mode command or by giving a permanent opposite command of the input device.

- The settings for this parameter are **OFF**, **CRUISE**, or **STEPPED**.

WARNING! Do not enable latch mode unless the power chair operator can safely operate the input device and the mode switch! Also be sure the user has demonstrated the ability to consistently do so!

RELATED PARAMETER: *The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal. The power chair will come to a stop if no input commands are given after the latched time-out. This setting can be found and will be discussed in the timing parameter located in IV. "Programming Parameters: System Settings."*

–Power: The power parameter can be set lower than 100% to limit the maximum driving torque. The power is usually reduced for power chair operators who may have cognitive disabilities that may result in the power chair being unintentionally driven into obstacles.

Reducing the power value also reduces the ability of the power chair to move over some obstacles and to maneuver on some surfaces. The power is generally only reduced for power chairs that will be operated exclusively indoors.

- The settings for this parameter range from **0%—100%**.

WARNING! After reducing the power setting, ensure that the power chair can maneuver over slopes and obstacles as required by the user!

- ☐ **Joystick**
  - ☐ **Center Deadband**
  - ☐ **Switch Operation**
  - ☐ **Tremor Suppression**
  - ☐ **Assign Directions**
  - ☐ **Calibrate**
  - ☐ **3 Direction Profile**
  - ☐ **Short Command**
  - ☐ **Throw**

–Center Deadband: The center (or neutral) deadband parameter defines how far the joystick must be moved from center for a command to be recognized. The value corresponds to the diameter of a circle around the joystick's center position. No drive or other command will be generated unless the joystick is moved out of this circle.

- The settings for this parameter range from **10%—50%**.

–Switch Operation: The switch operation parameter defines the joystick operating mode similar to a switch input device. If the switch operation is ON, proportional control is replaced by a switch function. If the joystick is moved out of the center (neutral) position for more than 50% of the operating range, a 100% command corresponding to the desired direction is generated.

- The settings for this parameter are **ON** or **OFF**.

NOTE: When changing from a proportional control to the switch operation, it may be necessary to reprogram your drive parameters. This is due to the input change.

–Tremor Suppression: The tremor suppresion parameter enables the operator to manipulate the responsiveness of the joystick to sudden or continually jerky movements. This is useful in the case of conditions that have hand tremors.

- The settings for this parameter range from **0%—100%**.
  0%—the filter is OFF
  100%—maximum tremor filter

NOTE: The higher the tremor suppression is set, the slower the response will become. When setting the tremor suppression, pay particular attention to stopping distances. As the parameter suppresses the response of the joystick commands, the stopping distance can be affected.

NOTE: When a short command is used to operate the system (only when 3 direction profile is set), the tremor suppression should not be set over 90%, otherwise any short command will be ignored.

–Assign Directions: The assign directions parameter is used to select which direction the joystick has to be moved for forward/reverse and left/right steering movements of the power chair.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the assign direction function.

–Calibrate: The calibrate parameter calibrates the joystick. This function is usually only necessary when the joystick element of the hand control has been replaced.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate function.

–3 Direction Profile: The 3 direction profile parameter should be enabled for users who have difficulty operating the joystick in all 4 directions. The 3 direction profile allows all power chair movements and menu browsing operations to be performed by only using 3 directions of the joystick (left, right, and reverse). A direction change (forward to reverse or vice versa) is achieved by deflecting the joystick shortly in the reverse direction and releasing it to its neutral position.

❍ The settings for this parameter are **ON** or **OFF**.

NOTE: To ensure this works correctly, the parameter tremor suppression must be no more than 20%.

–Short Command: The short command parameter defines the maximum duration for a short command. The short command is used to change directions when 3 Direction Mode is selected. If the command is longer than the programmed short command duration, the command will be recognized as a menu selection or drive command.

❍ The settings for this parameter are **SLOW**, **MEDIUM**, and **FAST**.

–Throw: The throw parameter defines how far the joystick must be moved in each direction to generate a full speed command. The joystick throw values correspond to the shape of an oval around the joystick's center position. Full speed or direction commands will be generated if the joystick is moved out of this oval. This function is used to set the joystick for short throw operations.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the joystick throw operation.

☐ **SOUND AND DISPLAY**
  - ☐ **Command Beep**
  - ☐ **Language**
  - ☐ **Backlight**
  - ☐ **Dimming Delay**
  - ☐ **Measurement System**
  - ☐ **Beep Frequency**
  - ☐ **Beep Medium Frequency**
  - ☐ **Beep High Frequency**
  - ☐ **Horn Frequency**
  - ☐ **Photo Album**
  - ☐ **Time**

–Command Beep: The command beep parameter enables a short beep to give an audible feedback when a menu command is recognized. If this audible feedback is not desired, the command beep parameter should be programmed **OFF**.

❍ The settings for this parameter are **ON** or **OFF**.

–Language: The language parameter sets the preferred language dialog. This setting only affects the hand control language displayed.

❍ The settings for this parameter are **ENGLISH, GERMAN, FRENCH, ITALIAN,** and **SPANISH**.

–Backlight: The backlight parameter sets the desired amount of illumination from the display.

❍ The settings for this parameter range from **5%—100%**.

–Dimming Delay: The dimming delay parameter allows you to set a time-out when the display gets dimmed. As soon as an input command is given, the display will illuminate normally. This feature prevents disturbances in dark environments (e.g.: a cinema).

❍ The settings for this parameter range from **0—240 seconds**.

–Measurement System: The measurement system parameter allows the choice of two different metric systems - US (miles, mph) and EU (km, km/h).

–Beep Frequency: The beep frequency parameter sets the pitch of the command and warning beep.

–Beep Medium Frequency: The beep medium frequency parameter is used to signal a seating change when the system is utilizing steadby select.

–Beep High Frequency: The beep high frequency paramter is used to signal a change in the auxiliary mode.

–Horn Frequency: The horn frequency parameter establishes the frequency of the horn.

–Photo Album: The photo album parameter should be set to Enabled for photo album viewing on the LCD. If this parameter is set to Disabled, the photo album will not be accessible on the LCD.

- ❍ The settings for this parameter are **ENABLE** or **DISABLE**.

–Time:

–Time Format: The time format parameter sets the format for the real-time clock on the main display.

- ❍ The settings for this parameter are **12h** or **24h**.

- ☐ **SPEED POT**
  - ☐ **Type**
  - ☐ **Scaling**
  - ☐ **Inactive Range**
  - ☐ **Calibrate**

–Type: The type parameter sets the type of movement needed from the speed potentiometer to make a speed command.

- The settings for this parameter are:

  Continuous: This means the user can turn the speed adjustment knob an unlimited amount; when the pot value reaches 100%, it will stay at 100% until it is turned in the opposite direction. The pot scaling parameter below sets how much turning is necessary to reach 100%.

  Limited Stroke: This is the standard type. Pot motion is physically limited in both directions. To use the knob continuously, the stops must be snapped off the knob. Once this has been done, you no longer have the option of going back to limited stroke operation with that knob.

  Continuous Forward: This is for a user who can move the knob only in one direction. This setting allows full pot control. Turning the knob increases the value up to 100%; the value stays at 100% as the knob continues to be turned and then jumps back to zero and starts increasing again. The range over which the value stays at 100% before resetting to zero is defined by the inactive range parameter below.

  Continuous Reverse: Same as above, but in the reverse direction.

NOTE: In order for the speed adjustment knob to have a "continuous" setting, the key must be removed from the knob.

–Scaling: The scaling parameter defines how much movement of the speed potentiometer corresponds to the potentiometer's full range. When set to 5%, the knob only needs to be turned 36 degrees to go from minimum to maximum. When set to 100%, the knob must be turned two full rotations (720 degrees) to go from minimum to maximum.

- The settings for this parameter range from **5%—100%**.

NOTE: This parameter is not applicable if the type is set to limited stroke.

–Inactive Range: The inactive range parameter defines a range where the speed adjustment knob is inactive at its maximum value. It is only valid when the type is set to Continuous Forward or Continuous Reverse. The inactive range is dependent on the scaling parameter.

- The settings for this parameter range from **0°—720°**.

–Calibrate: The calibrate parameter calibrates the speed adjustment knob. This is typically used when the speed adjustment knob has been replaced.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate operation.

- ☐ **MISCELLANEOUS**
  - ☐ **Standby Select**
    - ☐ **Standby Select**
    - ☐ **Standby Time-out**
    - ☐ **Standby Beep**
    - ☐ **Standby Aux Time-out**
    - ☐ **Standby Seat Time-out**
  - ☐ **On/Off Jack Supervision**
  - ☐ **Mode Jack Supervision**
  - ☐ **Mode Switch Timing**
  - ☐ **Mode Jack**
  - ☐ **Menu Navigation Mode**
  - ☐ **Menu Timing**

–Standby Select: The standby select parameter enables the user to automatically enter—after a defined time-out time (see parameter standby time-out)—a special menu selection from where all available profiles can be reached. This way the user can operate a system without using a mode switch to change profiles.

NOTE: The standby select mode is only available in a system having an LCD display.

- The settings for this parameter are **YES** and **NO**.

–Standby Time-out: The standby time-out parameter sets the time-out time before the system enters the standby select mode (see above parameter).

- The settings for this parameter range from **1—120 seconds**.

–Standby Beep: The standby beep parameter switches the beep signal on or off during standby select mode.

- The settings for this parameter are **ON** or **OFF**.

–Standby Aux Time-out: The standby aux time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in an Aux profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Aux profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–Standby Seat Time-out: The standby seat time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in a Seat profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Seat profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–On/Off Jack Supervision: The on/off jack supervision parameter can be used when an on/off switch is connected through the on/off jack. When programmed to Yes, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** or **NO**.

–Mode Jack Supervision: The mode jack supervision parameter can be used when a mode switch is connected through the mode jack. When programmed to Yes, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** or **NO**.

–Mode Switch Timing: The mode switch timing parameter determines how long the mode key must be pressed to generate a “Mode Long” command. This parameter is only active when the Mode Key Navigation parameter is set to advanced; see System Settings >Miscellaneous menu.

- The settings for this parameter range from **200—2000 milliseconds**.

–Mode Jack: The mode jack parameter sets the mode jack of the hand control to be a N.O. (Normally Open) or a N.C. (Normally Closed) switch.

- The settings for this parameter are **N.O.** and **N.C.**

–Menu Navigation Mode: The menu navigation mode parameter defines how the menu display is handled.

- The settings for this parameter are:
  Manual: The menu changes from one entry to the next each time a menu command is generated.
  Auto Repeat: The menu changes from menu entry to the next automatically as long as the command is active.
  Auto Change: The menu changes from one entry to the next without any menu command.

RELATED PARAMETER: *The menu timing parameter below sets the time interval between entries in Auto Repeat or Auto Change Mode.*

–Menu Timing: The menu timing parameter defines the intervals in effect when in either of the automatic menu navigation modes.
Manual: N/A; this parameter has no effect.
Auto Repeat: The interval between menu changes will be the programmed value.
Auto Change: The interval between menu changes will be the programmed value x 3.

- The settings for this parameter range from **200—2000 milliseconds**.

ALTERNATIVE CONTROLS PARAMETERS - ENHANCED DISPLAY

These parameters are only available if there is a Enhanced Display used in conjunction with secondary controls.

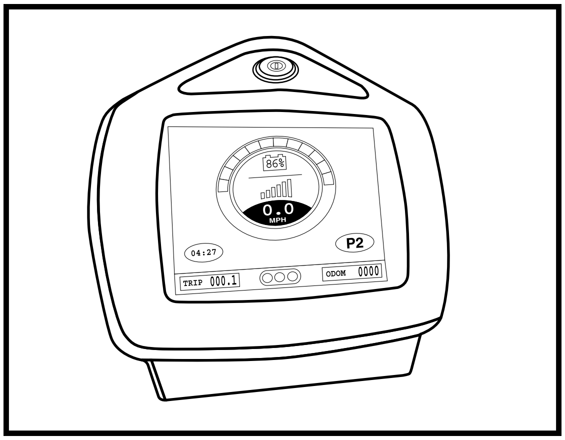


Figure 17. Q-Logic Enhanced Display

NOTE: These parameters are specific to alternative inputs used in conjunction with the Enhanced Display.

☐ **Specialty Input**
└☐ **Quick Setup**

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Speed** parameter allows a quick and rough setup of the current drive profile. This parameter changes all speed parameters like forward speed, reverse speed, and turn speed to a predefined value. Select a desired speed setting for the actual drive profile.

- The values for this parameter range from **1** to **5**.

“1” is the slowest speed setting, suitable for indoor movements, while “5” is the fastest predefined speed setting, specifically intended for outdoor use.

Use the individual speed parameters after setting the quick setup parameter for further fine tuning.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

	P1	**P2**	**P3**	**P4**	**P5**
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Response** parameter allows a quick and rough setup of the current drive profile. This parameter changes all response related parameters like forward/reverse/turn accel and forward/reverse/turn decel to a predefined value. Select a desired response setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is smoothest response setting, suitable for very slow indoor movements, while “5” is the most responsive predefined response setting, specifically intended for outdoor use.

Use the individual Accel/Decel parameters after setting the quick setup parameter for further fine tuning.

WARNING! Ensure that the user can safely operate the power chair at the selected response!

	P1	**P2**	**P3**	**P4**	**P5**
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Mode** parameter determines what operation is chosen for that particular profile. The operation can be Drive, Seat, Aux, or Disabled.

NOTE: Profile 1 will always be a drive profile and cannot be changed.

DRIVE

- ☐ **Profile 1,2,3,4, & 5**
  - ☐ **Forward Speed**
  - ☐ **Reverse Speed**
  - ☐ **Turn Speed**
  - ☐ **Speed Turn Rate**
  - ☐ **Forward Accel**
  - ☐ **Forward Decel**
  - ☐ **Reverse Accel**
  - ☐ **Reverse Decel**
  - ☐ **Turn Accel**
  - ☐ **Turn Decel**
  - ☐ **Turn Sensitivity**
  - ☐ **Latch Forward**
  - ☐ **Latch Reverse**
  - ☐ **Power**

–Forward Speed: The forward speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full forward input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed: The reverse speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full reverse input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed: The turn speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full left or right input.

When the speed potentiometer is between its minimum and maximum position, then the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate: The speed turn rate parameter defines the highest turn speed for the power chair when the speed potentiometer is at its maximum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Acceleration: The forward acceleration parameter sets the forward acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this value are rated in percentages and have a range of **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Deceleration: The forward deceleration parameter sets the forward deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Acceleration: The reverse acceleration parameter sets the reverse acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Deceleration: The reverse deceleration parameter sets the reverse deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Acceleration: The turn acceleration parameter sets the turning acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning acceleration time and a faster direction response. High turn acceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Deceleration: The turn deceleration parameter sets the turning deceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning deceleration time and a faster direction response. High turn deceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Sensitivity: Use the turn sensitivity parameter to adjust the sensitivity of turns when moving the joystick in the left and right direction. A higher value represents a stronger reaction when giving steering commands.

- The settings for this parameter range from **0%—100%**.

–Latch Forward/Reverse: When the latch forward/reverse parameter is set to CRUISE, the power chair will accelerate as long as the input device is operated. When the input device is released, the power chair will continue to drive at that particular speed. If deceleration is required, the input device has to be given an opposite command less than 50% or a mode command.

When the latch forward/reverse parameter is set to STEPPED, a short command of the input device operation greater than 50% will accelerate the chair to 33% of the maximum speed setting and the drive will continue after the input device is released. Additional short commands of the input device will accelerate to 66% and 100%. If deceleration is required, a short opposite command of the input device greater than 50% has to be given. A stop can be executed by giving a mode command or by giving a permanent opposite command of the input device.

❍ The settings for this parameter are **OFF, CRUISE,** or **STEPPED**.

WARNING! Do not enable latch mode unless the power chair operator can safely operate the input device and the mode switch. Also be sure the user has demonstrated the ability to consistently do so!

RELATED PARAMETER: *The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal. The power chair will come to a stop if no input commands are given after the latched time-out. This setting can be found and will be discussed in the timing parameter located in IV. “Programming Parameters: System Settings.”*

–Power: The power parameter can be set lower than 100% to limit the maximum driving torque. The power is usually reduced for power chair operators who may have cognitive disabilities that may result in the power chair being unintentionally driven into obstacles.

Reducing the power value also reduces the ability of the power chair to move over some obstacles and to maneuver on some surfaces. The torque limit is generally only reduced for power chairs that will be operated exclusively indoors.

❍ The settings for this parameter range from **0%—100%**.

WARNING! After reducing the power setting, ensure that the power chair can maneuver over slopes and obstacles as required by the user!

☐ **SETTINGS**
  └☐ **Input Setup**

–Input Setup: The input setup parameter defines which specialty input is to be used in conjunction with the Enhanced Display to operate the power chair.

- The settings for this parameter are:
  Other Specialty Input: Enhanced display is not being used as a input device (set when using Sip & Puff).
  1-Switch: This activates the Enhanced display single switch scanner.
  2-Switch
  3-Switch (**)
  4-Switch
  5-Switch
  3-Switch Head (special commands are used when tilted or seat profile)
  4-Switch Head (special commands are used when tilted or seat profile)
  5-Switch Head (special commands are used when tilted or seat profile)
  Proportional
  3-Direction Proportional

*****Note that in 3-switch mode, a toggle command is used to change between forward and reverse drive commands. This will not be possible when the tremor suppression is set to a high value. In this case, the short command to toggle the direction is perceived as a strong tremor and is therefore ignored as an input command.***

NOTE: When using a Sip & Puff specialty control, this parameter must be set to Other Specialty Input.

☐ **PROPORTIONAL INPUT**
  └☐ **Center Deadband**
    ☐ **Switch Operation**
    ☐ **Tremor Suppression**
    ☐ **Assign Directions**
    ☐ **Calibrate**
    ☐ **Short Command**
    ☐ **Throw**

–Center Deadband: The center (or neutral) deadband parameter defines how far the joystick must be moved from center for a command to be recognized. The value corresponds to the diameter of the circle around the joystick's center position. No drive or menu command will be generated unless the joystick is moved out of this circle.

- The settings for this parameter range from **5%—100%**.

–Switch Operation: The switch operation parameter defines the joystick operating mode similar to a switch input device. If the switch operation is ON, proportional control is replaced by a switch function. If the joystick is moved out of the center for more than 50% of the operating range, a 100% command corresponding to the desired direction is generated.

- The settings for this parameter are **ON** or **OFF**.

NOTE: When changing from a proportional control to the switch operation, it may be necessary to reprogram your drive parameters. This is due to the input change.

–Tremor Suppression: The tremor suppresion parameter enables the operator to manipulate the responsiveness of the joystick to sudden or continually jerky movements. This is useful in the case of conditions that have hand tremors.

❍ The settings for this parameter range from **0%—100%**.
0%—the filter is OFF
100%—Maximum tremor filter

NOTE: The higher the tremor suppression is set, the slower the response will become. When setting the tremor suppression, pay particular attention to stopping distances. As the parameter suppresses the response of the joystick commands, stopping distance can be affected.

NOTE: When a short command is used to operate the system (only when 3 direction profile is set), the tremor suppression should not be set over 90%, otherwise any short command will be ignored.

–Assign Directions: The assign directions parameter is used to select which direction the joystick has to be moved for forward/reverse and left/right steering movements of the power chair.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the assign direction function.

–Calibrate: The calibrate parameter calibrates the joystick. This function is usually only necessary when the joystick element of the hand control has been replaced.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate function.

–Short Command: The short command parameter defines the maximum duration for a short command. The short command is used to change directions when 3 direction mode is selected. If the command is longer than the programmed short command duration, the command will be recognized as a menu selection or drive command.

❍ The settings for this parameter are **SLOW**, **MEDIUM**, and **FAST**.

–Throw: The throw parameter defines how far the joystick must be moved in each direction to generate a full speed command. The joystick throw values correspond to the shape of an oval around the joystick's center position. Full speed or direction commands will be generated if the joystick is moved out of this oval. This function is used to set the joystick for short throw operations.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the joystick throw operation.

- ☐ **SWITCHED INPUT**
  - ☐ **Switched Timing**
  - ☐ **4-/8-Way Scan**
  - ☐ **Scan Rate**
  - ☐ **1 Switch Time-out**
  - ☐ **Head Left/Right Swap**
  - ☐ **Back Switch Toggle**
  - ☐ **Double Command**
  - ☐ **ASL Timing**

–**Switched Timing:** The switched timing parameter defines the menu command time for menu handling with switch type input devices.

❍ The range for this parameter is **200—2000 milliseconds**.

–**4-/8-Way Scan:** The 4-/8-way scan parameter defines the scan mode in either a 4-way scan mode or an 8-way scan mode. In the 4-way scan mode, the commands forward, reverse, left, and right are available. In an 8-way scan mode, intermediate diagonal directions are available. For example, if the scanner bar is located on the top left corner, the generated command will be turn left while driving forward.

NOTE: The scan function is only available when the input setup parameter is set to 1-switch.

❍ The settings for this parameter are **4** or **8**.

–**Scan Rate:** The scan rate parameter defines the scan speed in seconds. The higher the scan rate value, the slower the scanner bar rotates.

NOTE: The scan function is only available when the input setup parameter is set to 1-switch.

❍ The settings for this parameter are rated in seconds and the value range is **0.6—1.5 seconds**.

–**1-Switch Time-out:** The 1-switch time-out parameter defines the maximum time after which drive will be automatically disabled during drive with a 1-switch specialty input device.

❍ The settings for this parameter range from **0—60 seconds**.

NOTE: When set to 0, this feature is disabled.

–**Head Left/Right Swap:** The head left/right swap parameter will swap the left and right head pads when using a head array in seat mode.

❍ The settings for this parameter are **YES** or **NO**.

–Back Switch Toggle: The back switch toggle parameter is applicable only for 3-switch and 3-switch head configurations. When this parameter is set to Enabled, the back (center) switch can be used to toggle directions. When set to Disabled, the back switch cannot be used to toggle directions in Drive profiles, and the right command cannot be used to toggle directions in Seat profiles. Instead, the toggle must be performed with the mode switch.

❍ The settings for this parameter are **ENABLE** or **DISABLE**.

RELATED PARAMETER: *When this parameter is set to disable, the mode switch must be changed from mode to toggle for direction swap. The mode switch parameter can be found in IV. "Programming Parameters: Enhanced Display with Bluetooth Parameters" under "Miscellaneous>Mode Switch."*

–Double Command: The double command parameter allows you to disable the double mode command when using a head array. When disabled, mode commands will be made by a secondary mode switch.

❍ The settings for this parameter are **ENABLE** or **DISABLE**.

–ASL Timing: The ASL head array, in addition to the back, left, and right switches, has an optional fourth switch. When this switch is pressed and held, the ASL box generates a single command followed by a double command followed by a long command. The interval between the single and double commands is set by a potentiometer on the ASL box. The ASL timing parameter should be set to the same value as that set on the box.

NOTE: The interval between the double command and the long command is always approximately 3.5 seconds.

❍ The settings for this parameter range from **1—100 seconds**.

RELATED PARAMETER: *The programming parameter is only used when the mode switch is changed from mode to special. The mode switch parameter can be found in IV. "Programming Parameters: Enhanced Display w/ Bluetooth" under Miscellaneous>Mode Switch.*

- ☐ **MISCELLANEOUS**
  - ☐ **Standby Select**
    - ☐ **Standby Select**
    - ☐ **Standby Time-out**
    - ☐ **Standby Beep**
    - ☐ **Standby Aux Time-out**
    - ☐ **Standby Seat Time-out**
  - ☐ **Menu Navigation Mode**
  - ☐ **Menu Timing**

–Standby Select: The standby select mode enables the user to automatically enter—after a defined time-out time (see parameter standby time-out)—a special menu selection from where all available profiles can be reached. This way the user can operate a system without using a mode switch to change profiles.

NOTE: The standby select mode is only available in a system having an LCD display.

- The settings for this parameter are **YES** and **NO**.

–Standby Time-out: The standby time-out parameter sets the time-out time before the system enters the standby select mode (see above parameter).

- The settings for this parameter range from **1—120 seconds**.

–Standby Beep: The standyby beep parameter switches the beep signal on or off during standby select mode.

- The settings for this parameter are **ON** or **OFF**.

–Standby Aux Time-out: The standby aux time-out parameter sets whether the system will automatically switch to Standby Select mode after a programmable time period. This mode can be disabled when the system is in an Aux profile. In this case, make sure that the user can activate a mode switch to exit the Aux profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–Standby Seat Time-out: The standby seat time-out parameter sets whether the system will automatically switch to Standby Select mode after a programmable time period. This mode can be disabled when the system is in a Seat profile. In this case, make sure that the user can activate a mode switch to exit the Seat profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–Menu Navigation Mode: The menu navigation mode parameter defines how the menu display is handled.

- The settings for this parameter are:
  Manual: The menu changes from one entry to the next each time a menu command is generated.
  Auto Repeat: The menu changes from menu entry to the next automatically as long as the command is active.
  Auto Change: The menu changes from one entry to the next without any menu command.

***RELATED PARAMETER:** The menu timing parameter below sets the time interval between entries in Auto Repeat or Auto Change Mode.*

–**Menu Timing:** The menu timing parameter defines the intervals in effect when in either of the automatic menu navigation modes.

Manual: N/A—This parameter has no effect.
Auto Repeat: The interval between menu changes will be the programmed value.
Auto Change: The interval between menu changes will be the programmed value x 3.

❍ The settings for this parameter range from **200—2000 milliseconds**.

ALTERNATIVE CONTROLS PARAMETERS - STAND-ALONE JOYSTICK

These parameters are only available if there is a Stand-alone Joystick Module present in the system.

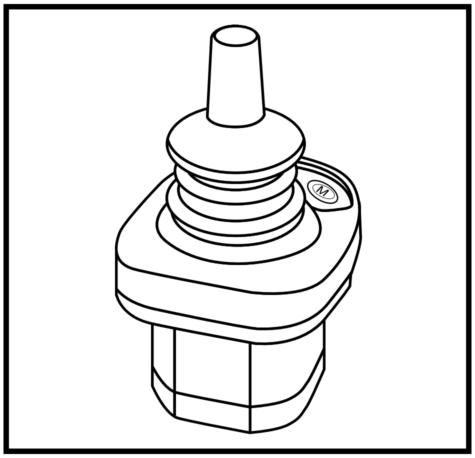


Figure 18. Stand-alone Joystick

☐ QUICK SETUP

NOTE: The stand-alone joystick only has three available drive profiles and one seating profile when used as the primary input device. Profile 4 and 5 become available when a module with a display is used in conjunction with the stand-alone joystick.

	P1	**P2**	**P3**	**P4**	**P5**
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dis	Dis

The **Quick Setup Speed** parameter allows a quick and rough setup of the current drive profile. This parameter changes all speed parameters like forward speed, reverse speed, and turn speed to a predefined value. Select a desired speed setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is the slowest speed setting, suitable for indoor movements, while “5” is the fastest predefined speed setting, specifically intended for outdoor use.

Use the individual speed parameters after setting the Quick Setup Parameter for further fine tuning.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dis	Dis

The **Quick Setup Response** parameter allows a quick and rough setup of the current drive profile. This parameter changes all response related parameters like forward/reverse/turn accel and forward/reverse/turn decel to a predefined value. Select a desired response setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is smoothest response setting, suitable for very slow indoor movements, while “5” is the most responsive predefined response setting, specifically intended for outdoor use.

Use the individual accel/decel parameters after setting the quick setup parameter for further fine tuning.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected response!

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dis	Dis

The **Quick Setup Mode** parameter determines what operation is chosen for that particular profile. The operation can be Drive, Seat, Aux, or Disabled.

NOTE: Profile 1 will always be a drive profile and cannot be changed.

DRIVE
- ☐ **Profile 1,2,3,4, & 5**
  - ☐ **Forward Speed**
  - ☐ **Reverse Speed**
  - ☐ **Turn Speed**
  - ☐ **Speed Turn Rate**
  - ☐ **Forward Accel**
  - ☐ **Forward Decel**
  - ☐ **Reverse Accel**
  - ☐ **Reverse Decel**
  - ☐ **Turn Accel**
  - ☐ **Turn Decel**
  - ☐ **Turn Sensitivity**
  - ☐ **Latch Forward**
  - ☐ **Latch Reverse**
  - ☐ **Power**

***Profiles 4 and 5 are not available unless the stand-alone joystick is used in conjunction with a hand control.**

–Forward Speed: The forward speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full forward input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed: The reverse speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full reverse input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed: The turn speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full left or right input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate: The speed turn rate parameter defines the highest turn speed for the power chair when the speed potentiometer is at its maximum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Acceleration: The forward acceleration parameter sets the forward acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Deceleration: The forward deceleration parameter sets the forward deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Acceleration: The reverse acceleration parameter sets the reverse acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Deceleration: The reverse deceleration parameter sets the reverse deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

○ The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Acceleration: The **Turn Acceleration** parameter sets the turning acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning acceleration time and a faster direction response. High turn acceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

○ The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Deceleration: The turn deceleration parameter sets the turning deceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning deceleration time and a faster direction response. High turn deceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

○ The settings for this parameter range from **5%—100%**.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Sensitivity: The turn sensitivity parameter adjusts the sensitivity of turns when moving the joystick in the left and right direction. A higher value represents a stronger reaction when giving steering commands.

○ The settings for this parameter range from **0%—100%**.

–Latch Forward/Reverse: The latch forward/reverse parameter enables latched driving in forward or reverse directions. If latch is ON, the power chair will accelerate until the desired speed is reached. If the command is released, the controller maintains the speed. It is still possible to control the direction. The power chair will decelerate if an opposite command of less than 50% is applied. A stop can be produced with a mode switch command or an opposite speed command of more than 50%.

❍ The settings for this parameter are **ON** and **OFF**.

WARNING! Do not enable latch mode unless the power chair operator can safely operate the input device and the mode switch. Also be sure the user has demonstrated the ability to consistently do so!

RELATED PARAMETER: *The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal. The power chair will come to a stop if no input commands are given after the latched time-out. This setting can be found and will be discussed in the timing parameter located in IV. "Programming Parameters: System Settings."*

–Power: The power parameter can be set lower than 100% to limit the maximum driving torque. The power is usually reduced for power chair operators who may have cognitive disabilities that may result in the power chair being unintentionally driven into obstacles.

Reducing the power value also reduces the ability of the power chair to move over some obstacles and to maneuver on some surfaces. The torque limit is generally only reduced for power chairs that will be operated exclusively indoors.

❍ The settings for this parameter range from **0%—100%**.

WARNING! After reducing the power setting, ensure that the power chair can maneuver over slopes and obstacles as required by the user!

- ☐ **JOYSTICK**
  - ☐ **Switch Operation**
  - ☐ **Tremor Suppression**
  - ☐ **Assign Directions**
  - ☐ **Calibrate**
  - ☐ **Throw**

–Switch Operation: The switch operation parameter defines the joystick operating mode similar to a switch input device. If the switch operation is ON, proportional control is replaced by a switch function. If the joystick is moved out of the center for more than 50% of the operating range, a 100% command corresponding to the desired direction is generated.

- The settings for this parameter are **ON** and **OFF**.

NOTE: When changing from a proportional control to the switch operation, it may be necessary to reprogram the drive parameters. This is due to the input change.

–Tremor Suppression: The tremor suppresion parameter enables the operator to manipulate the responsiveness of the joystick to sudden or continually jerky movements. This is useful in the case of conditions that have hand tremors.

- The settings for this value are rated in percentages and have a range of **0%—100%**.
  0%—the filter is OFF
  100%—Maximum tremor filter

NOTE: The higher the tremor suppression is set, the slower the response will become. When setting the tremor suppression, pay particular attention to stopping distances. As the parameter suppresses the response of the joystick commands, stopping distance can be affected.

NOTE: When a short command is used to operate the system (only when 3 direction profile is set), the tremor suppression should not be set over 90%, otherwise any short command will be ignored.

–Assign Directions: The assign directions parameter is used to select which direction the joystick has to be moved for forward/reverse and left/right steering movements of the power chair.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the assign direction function.

–Calibrate: The calibrate parameter calibrates the joystick. This function is usually only necessary when the joystick element of the hand control has been replaced.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate function.

–Throw: The throw parameter defines how far the joystick must be moved in each direction to generate a full speed command. The joystick throw values correspond to the shape of an oval around the joystick's center position. Full speed or direction commands will be generated if the joystick is moved out of this oval. This function is used to set the joystick for short throw operations.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the joystick throw operation.

- ☐ **MISCELLANEOUS**
  - ☐ **Standby Select**
    - ☐ **Standby Select**
    - ☐ **Standby Time-out**
    - ☐ **Standby Beep**
    - ☐ **Standby Aux Time-out**
    - ☐ **Standby Seat Time-out**
  - ☐ **On/Off Jack Supervision**
  - ☐ **Mode Switch Timing**
  - ☐ **Menu Navigation Mode**
  - ☐ **Menu Timing**

–Standby Select: The standby select mode enables the user to automatically enter—after a defined time-out time (see parameter standby time-out)—a special menu selection from where all available profiles can be reached. This way the user can operate a system without using a mode switch to change profiles.

NOTE: The standby select mode is only available in a system having an LCD display.

- The settings for this parameter are **YES** and **NO**.

–Standby Time-out: The standby time-out parameter sets the time-out time before the system enters the standby select mode (see above parameter).

- The settings for this parameter range from **1—120 seconds**.

–Standby Beep: The standby beep parameter switches the beep signal on or off during standby select mode.

- The settings for this parameter are **ON** or **OFF**.

–Standby Aux Time-out: The standby aux time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in an Aux profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Aux profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–Standby Seat Time-out: The standby seat time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in a Seat profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Seat profile.

- The settings for this parameter are **ENABLED** or **DISABLED**.

–On/Off Jack Supervision: The on/off jack supervision parameter can be used when a on/off switch is connected through the on/off jack. When programmed to Yes, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** and **NO**.

–Mode Switch Timing: The mode switch timing parameter determines how long the mode key must be pressed to generate a "Mode Long" command. This parameter is only active when the Mode Key Navigation parameter is set to advanced; see System Settings>Miscellaneous menu.

❍ The range for this parameter is **200—2000 milliseconds**.

–Menu Navigation Mode: The menu navigation mode parameter defines how the menu display is handled.

❍ The settings for this parameter are:
Manual: The menu changes from one entry to the next each time a menu command is generated.
Auto Repeat: The menu changes from menu entry to the next automatically as long as the command is active.
Auto Change: The menu changes from one entry to the next without any menu command.

RELATED PARAMETER: *The menu timing parameter below sets the time interval between entries in Auto Repeat or Auto Change Mode.*

–Menu Timing: The menu timing parameter defines the intervals in effect when in either of the automatic menu navigation modes.
Manual: N/A this parameter has no effect.
Auto Repeat: The interval between menu changes will be the programmed value.
Auto Change: The interval between menu changes will be the programmed value x 3.

❍ The range for this parameter is **200—2000 milliseconds**.

ALTERNATIVE CONTROLS PARAMETERS - ATTENDANT JOYSTICK

These parameters are only available if the attendant module is present in the system.

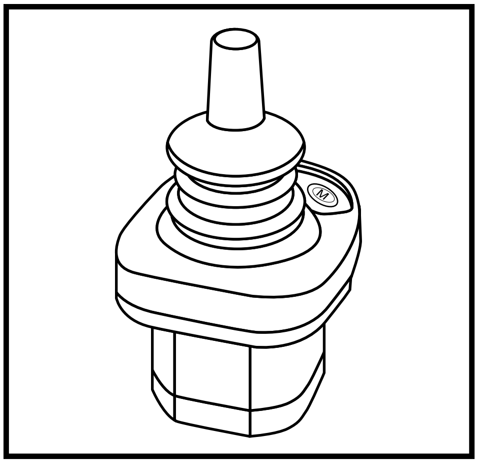


Figure 19. Attendant Joystick

☐ QUICK SETUP

NOTE: The Attendant Joystick only has 3 available profiles. Profile 1 will always be a drive profile, but profile 2 or 3 can be programmed to be either a drive or a seating profile.

	P1	P2	P3		
SPEED	1	2	2		
RESPONSE	1	2	2		
MODE		Sea	Dri		

The **Quick Setup Speed** parameter allows a quick and rough setup of the current drive profile. This parameter changes all speed parameters like forward speed, reverse speed, and turn speed to a predefined value. Select a desired speed setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

"1" is the slowest speed setting, suitable for indoor movements, while "5" is the fastest predefined speed setting, specifically intended for outdoor use.

Use the individual speed parameters after setting the Quick Setup Parameter for further fine tuning.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

	P1	**P2**	**P3**		
SPEED	1	2	2		
RESPONSE	1	2	2		
MODE		Sea	Dri		

The **Quick Setup Response** parameter allows a quick and rough setup of the current drive profile. This parameter changes all response related parameters like forward/reverse/turn accel and forward/reverse/turn decel to a predefined value. Select a desired response setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is smoothest response setting, suitable for very slow indoor movements, while “5” is the most responsive predefined response setting, specifically intended for outdoor use.

Use the individual Accel/Decel parameters after setting the Quick Setup Parameter for further fine tuning.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected response!

	P1	**P2**	**P3**		
SPEED	1	2	2		
RESPONSE	1	2	2		
MODE		Sea	Dri		

The **Quick Setup Mode** parameter determines what operation is chosen for that particular profile. The operation can be Drive, Seat, Aux, or Disabled.

NOTE: Profile 1 will always be a drive profile and cannot be changed.

DRIVE

- ☐ **Profile 1,2,3,4, & 5**
  - ☐ **Forward Speed**
  - ☐ **Reverse Speed**
  - ☐ **Turn Speed**
  - ☐ **Speed Turn Rate**
  - ☐ **Forward Accel**
  - ☐ **Forward Decel**
  - ☐ **Reverse Accel**
  - ☐ **Reverse Decel**
  - ☐ **Turn Accel**
  - ☐ **Turn Decel**
  - ☐ **Turn Sensitivity**
  - ☐ **Latch Forward**
  - ☐ **Latch Reverse**
  - ☐ **Power**

–Forward Speed: The forward speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full forward input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed: The reverse speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full reverse input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed: The turn speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full left or right input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate: The speed turn rate parameter defines the highest turn speed for the power chair when the speed potentiometer is at its maximum position and when giving a turn input greater than the center deadband, but not less.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Acceleration: The forward acceleration parameter sets the forward acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Deceleration: The forward deceleration parameter sets the forward deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Acceleration: The reverse acceleration parameter sets the reverse acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Deceleration: The reverse deceleration parameter sets the reverse deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Acceleration: The turn acceleration parameter sets the turning acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning acceleration time and a faster direction response. High turn acceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Deceleration: The turn deceleration parameter sets the turning deceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning deceleration time and a faster direction response. High turn deceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

❍ The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Sensitivity: Use the turn sensitivity parameter to adjust the sensitivity of turns when moving the joystick in the left and right direction. A higher value represents a stronger reaction when giving steering commands

❍ The settings for this parameter range from **0%—100%**.

–Latch Forward/Reverse: The latch forward/reverse parameter enables latched driving in forward or reverse directions. If latch is ON, the power chair will accelerate until the desired speed is reached. If the command is released, the controller maintains the speed. It is still possible to control the direction. The power chair will decelerate if an opposite command of less than 50% is applied. A stop can be produced with a mode switch command or an opposite speed command of more than 50%.

- The settings for this parameter are **ON** and **OFF**.

WARNING! Do not enable latch mode unless the power chair operator can safely operate the input device and the mode switch, and has demonstrated the ability to do so consistently!

RELATED PARAMETER: *The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal. The power chair will come to a stop if no input commands are given after the latched time-out. This setting can be found and will be discussed in the timing parameter located in System Settings.*

–Power: The power parameter can be set lower than 100% to limit the maximum driving torque. The power is usually reduced for power chair operators who may have cognitive disabilities that may result in the power chair being unintentionally driven into obstacles.

Reducing the power value also reduces the ability of the power chair to move over some obstacles and to maneuver on some surfaces. The power is generally only reduced for power chairs that will be operated exclusively indoors.

- The settings for this parameter range from **0%—100%**.

WARNING! After reducing the power setting, ensure that the power chair can maneuver over slopes and obstacles as required by the user!

- ☐ **JOYSTICK**
  - ☐ **Switch Operation**
  - ☐ **Tremor Suppression**
  - ☐ **Assign Directions**
  - ☐ **Calibrate**
  - ☐ **Throw**

–Switch Operation: The switch operation parameter defines the joystick operating mode similar to a switch input device. If the switch operation is ON, proportional control is replaced by a switch function. If the joystick is moved out of the center (neutral) position for more than 50% of the operating range, a 100% command corresponding to the desired direction is generated.

- The settings for this parameter are **ON** and **OFF**.

NOTE: When changing from a proportional control to the switch operation, it may be necessary to reprogram your drive parameters. This is due to the input change.

–Tremor Suppression: The tremor suppresion parameter enables the operator to manipulate the responsiveness of the joystick to sudden or continually jerky movements. This is useful in the case of conditions that have hand tremors.

- The settings for this value are rated in percentages and have a range of **0%—100%**.
  0%—the filter is OFF
  100%—Maximum tremor filter

NOTE: The higher the tremor suppression parameter is set, the slower the response will become. When setting the tremor suppression, pay particular attention to stopping distances. As the parameter suppresses the response of the joystick commands, stopping distance can be affected.

NOTE: When a short command is used to operate the system (only when 3 direction profile is set), the tremor suppression should not be set over 90%, otherwise any short command will be ignored.

–Assign Directions: The assign directions parameter is used to select which direction the joystick has to be moved for forward/reverse and left/right steering movements of the power chair.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the assign direction function.

–Calibrate: The calibrate parameter calibrates the joystick. This function is usually only necessary when the joystick element of the hand control has been replaced.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate function.

–Throw: The throw parameter defines how far the joystick must be moved in each direction to generate a full speed command. The joystick throw values correspond to the shape of an oval around the joystick's center position. Full speed or direction commands will be generated if the joystick is moved out of this oval. This function is used to set the joystick for short throw operations.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the joystick throw operation.

- ☐ **MISCELLANEOUS**
  - ☐ **On/Off Jack Supervision**
  - ☐ **Mode Switch Timing**
  - ☐ **Menu Navigation Mode**
  - ☐ **Menu Timing**

–On/Off Jack Supervision: The on/off jack supervision parameter can be used when an on/off switch is connected through the on/off jack. When programmed to Yes, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** and **NO**.

–Mode Switch Timing: The mode switch timing parameter determines how long the mode key must be pressed to generate a “Mode Long” command. This parameter is only active when the Mode Key Navigation parameter is set to advanced; see System Settings >Miscellaneous menu.

- The range for this parameter is **200—2000 milliseconds**.

–**Menu Navigation Mode:** The menu navigation mode parameter defines how the menu display is handled.

- The settings for this parameter are:
  Manual: The menu changes from one entry to the next each time a menu command is generated.
  Auto Repeat: The menu changes from menu entry to the next automatically as long as the command is active.
  Auto Change: The menu changes from one entry to the next without any menu command.

RELATED PARAMETER: *The menu timing parameter below sets the time interval between entries in Auto Repeat or Auto Change Mode.*

–**Menu Timing:** The **Menu Timing** parameter defines the intervals in effect when in either of the automatic menu navigation modes.

Manual: N/A this parameter has no effect.
Auto Repeat: The interval between menu changes will be the programmed value.
Auto Change: The interval between menu changes will be the programmed value x 3.

- The range for this parameter is **200—2000 milliseconds**.

ALTERNATIVE CONTROLS PARAMETERS - SIP & PUFF

These parameters are only present when a Sip & Puff module is used in the system.

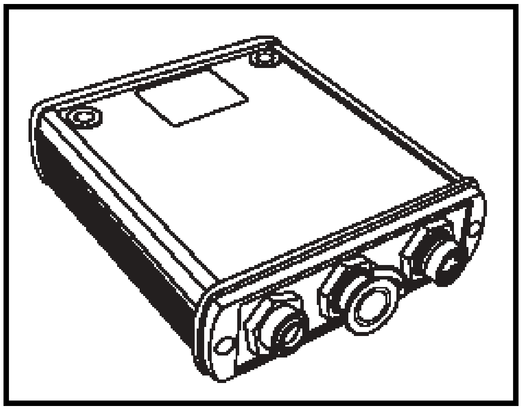


Figure 20. Sip & Puff

☐ QUICK SETUP

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Speed** parameter allows a quick and rough setup of the current drive profile. This parameter changes all speed parameters like forward speed, reverse speed, and turn speed to a predefined value. Select a desired speed setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is the slowest speed setting, suitable for indoor movements, while “5” is the fastest predefined speed setting, specifically intended for outdoor use.

Use the individual speed parameters after setting the Quick Setup Parameter for further fine tuning.

⚠ WARNING! Ensure that the user can safely operate the power chair at the selected speed!

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Response** parameter allows a quick and rough setup of the current drive profile. This parameter changes all response related parameters like forward/reverse/turn accel and forward/reverse/turn decel to a predefined value. Select a desired response setting for the actual drive profile.

❍ The values for this parameter range from **1** to **5**.

“1” is smoothest response setting, suitable for very slow indoor movements, while “5” is the most responsive predefined response setting, specifically intended for outdoor use.

Use the individual Accel/Decel parameters after setting the Quick Setup parameter for further fine tuning. Ensure that the user can safely operate the power chair at the selected response.

WARNING! Ensure that the user can safely operate the power chair at the selected response!

	P1	P2	P3	P4	P5
SPEED	1	2	3	4	5
RESPONSE	1	2	3	4	5
MODE		Dri	Dri	Dri	Sea

The **Quick Setup Mode** parameter determines what operation is chosen for that particular profile. The operation can be Drive, Seat, Aux, or Disabled.

NOTE: Profile 1 will always be a drive profile and cannot be changed.

- ☐ **DRIVE**
  - ☐ **Profile 1,2,3,4, & 5**
    - ☐ **Forward Speed**
    - ☐ **Reverse Speed**
    - ☐ **Turn Speed**
    - ☐ **Speed Turn Rate**
    - ☐ **Forward Accel**
    - ☐ **Forward Decel**
    - ☐ **Reverse Accel**
    - ☐ **Reverse Decel**
    - ☐ **Turn Accel**
    - ☐ **Turn Decel**
    - ☐ **Turn Sensitivity**
    - ☐ **Latch Forward**
    - ☐ **Latch Reverse**
    - ☐ **Power**

–Forward Speed: The forward speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full forward input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Reverse Speed: The reverse speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full reverse input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Turn Speed: The turn speed parameter defines the highest speed of the power chair when the speed potentiometer is at its maximum position and when giving a full left or right input.

When the speed potentiometer is between its minimum and maximum position, the achievable speed is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Speed Turn Rate: The speed turn rate parameter defines the highest turn speed of the power chair while giving a turn input. Used with switched input, the value has to be smaller than the turn speed. Used with proportional input, the value can be the same as the turn speed.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected speed!

–Forward Acceleration: The forward acceleration parameter sets the forward acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Forward Deceleration: The forward deceleration parameter sets the forward deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Reverse Acceleration: The reverse acceleration parameter sets the reverse acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter acceleration time and a faster start. High acceleration values provide abrupt acceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Reverse Deceleration: The reverse deceleration parameter sets the reverse deceleration for the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter deceleration time and a faster stop. High deceleration values provide abrupt deceleration and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Acceleration: The turn acceleration parameter sets the turning acceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning acceleration time and a faster direction response. High turn acceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the acceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected acceleration!

–Turn Deceleration: The turn deceleration parameter sets the turning deceleration of the power chair when the speed potentiometer is at its maximum position. A larger value represents a shorter turning deceleration time and a faster direction response. High turn deceleration values provide abrupt direction changes and should only be used under special circumstances.

When the speed potentiometer is between its minimum and maximum position, the deceleration is linearly scaled between this parameter and a predefined low value.

- The settings for this parameter range from **5%—100%**.

WARNING! Ensure that the user can safely operate the power chair at the selected deceleration!

–Turn Sensitivity: Use the turn sensitivity parameter to adjust the sensitivity of turns when moving the joystick in the left and right direction. A higher value represents a stronger reaction when giving steering commands

- The settings for this parameter range from **0%—100%**.

–Latch Forward/Reverse: The latch forward/reverse parameter enables latched driving in forward or reverse direction. If latch is ON, the power chair will accelerate until the desired speed is reached. If the command is released, the controller maintains the speed. It is still possible to control the direction. The power chair will decelerate if an opposite command of less than 50% is applied. A stop can be produced with a mode switch command or a opposite speed command of more than 50%.

- The settings for this parameter are **ON** and **OFF**.

WARNING: Do not enable latch mode unless the power chair operator can safely operate the input device and the mode switch, and has demonstrated the ability to do so consistently!

***RELATED PARAMETER:** The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal. The power chair will come to a stop if no input commands are given after the latched time-out. This setting can be found and will be discussed in the timing parameter located in System Settings.*

–Power: The power parameter can be set lower than 100% to limit the maximum driving torque. The power is usually reduced for power chair operators who may have cognitive disabilities that may result in the power chair being unintentionally driven into obstacles.

Reducing the power value also reduces the ability of the power chair to move over some obstacles and to maneuver on some surfaces. The power is generally only reduced for power chairs that will be operated exclusively indoors.

- The settings for this value are rated in percentages and have a range of **0%—100%**.

WARNING! After reducing the power setting, ensure that the power chair can maneuver over slopes and obstacles as required by the user!

- ☐ **SETTINGS**
  - ☐ **2- or 4-Pressure**
  - ☐ **Sampling Delay Sip**
  - ☐ **Sampling Delay Puff**
  - ☐ **Adjust Pressures**
  - ☐ **Calibrate**
  - ☐ **Pressure Setup**
    - ☐ **4 Stages**
      - ☐ **Adjustment**
      - ☐ **Assign Directions**
    - ☐ **2 Stages**
      - ☐ **Adjustment**
      - ☐ **Assign Directions**

–2- or 4-Pressure: The 2- or 4-pressure parameter sets the method of operating the Sip & Puff. 4-pressure operation requires a hard sip, hard puff, soft sip, and soft puff to make forward, reverse, left, and right commands. 2-pressure operation uses one or two sips, and one or two puffs to make the four drive commands.

RELATED PARAMETERS: *Sampling delay sip and sampling delay puff.*

- The settings for this parameter are **2-** or **4-PRESSURE**.

–Sampling Delay Sip: The sampling delay sip parameter sets the time that a sip must be applied before it is recognized by the system. It is usually only necessary to adjust this parameter when changing between 2- and 4- pressure operation. The standard setting for 2-pressure operation is 20 milliseconds. The standard setting for 4-pressure operation is 200 milliseconds.

- The settings for this parameter range from **20—1000 milliseconds**.

–Sampling Delay Puff: The sampling delay puff parameter sets the time that a puff must be applied before it is recognized by the system. It is usually only necessary to adjust this parameter when changing between 2- and 4- pressure operation. The standard setting for 2-pressure operation is 20 milliseconds. The standard setting for 4-pressure operation is 200 milliseconds.

- The settings for this parameter range from **20—1000 milliseconds**.

–Adjust Pressures: The adjust pressures parameter allows you to set the pressure of the sips and puffs needed to perform drive commands.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the adjust pressure function.

–Calibrate: The calibrate parameter allows you to make calibration adjustments to the sip and puff module.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the calibrate function.

–**Pressure Setup:** 4-Pressure

–**Adjustment:**

Hard Sip: The hard sip parameter sets the amount of vacuum that must be applied to make a hard sip command. The hard sip value must always be at least 5% greater than the soft sip value, or the system will generate an error.

The minimum value is 15%, or about -3.3 inches of water.

❍ The settings for this parameter range from **15%—100%**.

Hard Puff: The hard puff parameter sets the amount of vacuum that must be applied to make a hard puff command. The hard puff value must always be at least 5% greater than the soft puff value, or the system will generate an error.

The minimum value is 15%, or about +3.3 inches of water.

❍ The settings for this parameter range from **15%—100%**.

Soft Sip: The soft sip parameter sets the amount of vacuum that must be applied to make a soft sip command. The soft sip value must always be at least 5% less than the hard sip value, or the system will generate an error.

The minimum value is 8%, or about -1.8 inches of water.

❍ The settings for this parameter range from **8%—100%**.

Soft Puff: The soft puff parameter sets the amount of vacuum that must be applied to make a soft puff command. The soft puff value must always be at least 5% less than the hard puff value, or the system will generate an error.

The minimum value is 8%, or about +1.8 inches of water.

❍ The settings for this parameter range from **8%—100%**.

–**Assign Directions:** The assign directions parameters allow pressure commands to be assigned to specific directions.

Forward: The forward parameter assigns the pressure that will give a forward command. (This same pressure in the seat or Aux screens will give a previous command.)

The standard setting for Forward is Hard Puff.

❍ The settings for this parameter are **Hard Sip/Hard Puff/Soft Sip/Soft Puff**.

Reverse: The reverse parameter assigns the pressure that will give a reverse command. (This same pressure in the seat or Aux screens will give a next command.)

The standard setting for Reverse is Hard Sip.

❍ The settings for this parameter are **Hard Sip/Hard Puff/Soft Sip/Soft Puff**.

Right: The right parameter assigns the pressure that will give a right command. (This same pressure in the seat or Aux screens will give a select command.)

The standard setting for Right is Soft Puff.

- The settings for this parameter are **Hard Sip/Hard Puff/Soft Sip/Soft Puff**.

Left: The left parameter assigns the pressure that will give a left command. (This same pressure in the seat or Aux screens will give an escape command.)

The standard setting for Left is Soft Sip.

- The settings for this parameter are **Hard Sip/Hard Puff/Soft Sip/Soft Puff**.

–Pressure Setup: 2-Pressure
–Adjustment:
Sip: The sip parameter sets the amount of vacuum that must be applied to make a sip command.

The minimum value is 8% or about -1.8 inches of water.

- The settings for this parameter range from **8%—100%**.

Puff: The puff parameter sets the amount of vacuum that must be applied to make a puff command.

The minimum value is 8% or about +1.8 inches of water.

- The settings for this parameter range from **8%—100%**.

–Adjustment Timing: The adjustment timing parameter sets the time between two commands so that they are read as a double command. The two commands must be given within the set time to be recognized as a double command. If the time between the two commands is greater than the set time, the two commands are interpreted as two separate, single commands.

- The settings for this parameter are **SLOW, MEDIUM, FAST**.
  Slow = 20–650 milliseconds
  Med = 20–500 milliseconds
  Fast = 20–300 milliseconds

Be sure to check the sampling delay sip and sampling delay puff parameters to make sure they are set at 20 milliseconds for 2-pressure operation.

–Assign Directions: The assign directions parameters allow pressure commands to be assigned to specific directions.
Forward: The forward parameter assigns the pressure that will give a forward command. (This same pressure in the seat or Aux screens will give a previous command.)

The standard setting for Forward is Puff Short + Continuous (2 puffs).

- The settings for this parameter are **Puff Short + Continuous/Sip Short + Continuous/Puff Continuous/Sip Continuous**.

Reverse: The reverse parameter assigns the pressure that will give a reverse command. (This same pressure in the seat or Aux screens will give a next command.)

The standard setting for this parameter is Sip Short + Continuous (2 Sips).

- The settings for this parameter are **Puff Short + Continuous/Sip Short + Continuous/Puff Continuous/Sip Continuous**.

Right: The right parameter assigns the pressure that will give a right command. (This same pressure, in the seat or Aux screens, will give a select command.)

The standard setting for Right is Puff Continuous (1 Puff).

- The settings for this parameter are **Puff Short + Continuous/Sip Short + Continuous/Puff Continuous/Sip Continuous**.

Left: The left parameter assigns the pressure that will give a left command. (This same pressure, in the seat or Aux screens, will give a escape command.)

The standard setting for Left is Sip Continuous (1 Sip).

- The settings for this parameter are **Puff Short + Continuous/Sip Short + Continuous/Puff Continuous/Sip Continuous**.

- ☐ **MISCELLANEOUS**
  - ☐ **Standby Select**
    - ☐ **Standby Select**
    - ☐ **Standby Time-out**
    - ☐ **Standby Beep**
    - ☐ **Standby Aux Time-out**
    - ☐ **Standby Seat Time-out**
  - ☐ **Menu Navigation Mode**
  - ☐ **Menu Timing**

–Standby Select: The standby select mode enables the user to automatically enter—after a defined time-out time (see parameter standby time-out)—a special menu selection from where all available profiles can be reached. This way the user can operate a system without using a mode switch to change profiles.

NOTE: The standby select mode is only available in a system having an LCD display.

❍ The settings for this parameter are **YES** and **NO**.

–Standby Time-out: The standby time-out parameter sets the time-out time before the system enters the standby select mode (see above parameter).

❍ The settings for this parameter range from **1—120 seconds**.

–Standby Beep: The standby beep parameter switches the beep signal on or off during standby select mode.

❍ The settings for this parameter are **ON** or **OFF**.

–Standby AUX Time-out: The standby aux time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in an Aux profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Aux profile.

❍ The settings for this parameter are **ENABLED** or **DISABLED**.

–Standby Seat Time-out: The standby seat time-out parameter sets whether the system will automatically switch to Standby mode after a predetermined time period. This mode can be disabled when the system is in a Seat profile. In this case, it has to be made sure that the user can activate a mode switch to exit the Seat profile.

❍ The settings for this parameter are **ENABLED** or **DISABLED**.

–Menu Navigation Mode: The menu navigation mode parameter defines how the menu display is handled.

❍ The settings for this parameter are:
Manual: The menu changes from one entry to the next each time a menu command is generated.
Auto Repeat: The menu changes from menu entry to the next automatically as long as the command is active.
Auto Change: The menu changes from one entry to the next without any menu command.

RELATED PARAMETER: *The menu timing parameter below sets the time interval between entries in Auto Repeat or Auto Change Mode.*

–**Menu Timing:** The menu timing parameter defines the intervals in effect when in either of the automatic menu navigation modes.

Manual: N/A this parameter has no effect.
Auto Repeat: The interval between menu changes will be the programmed value.
Auto Change: The interval between menu changes will be the programmed value x 3.

❍ The settings for this parameter range from **200—2000 milliseconds**.

ENHANCED DISPLAY WITH BLUETOOTH PARAMETERS

These are programming features specific to only the Enhanced Display.

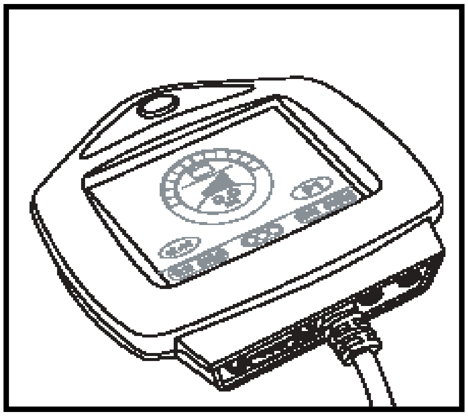


Figure 21. Enhanced Display With Bluetooth

- ☐ **SOUND AND DISPLAY**
  - ☐ **Command Beep**
  - ☐ **Language**
  - ☐ **Backlight**
  - ☐ **Dimming Delay**
  - ☐ **Measurement System**
  - ☐ **Photo Album**
  - ☐ **Time**
    - ☐ **Time Format**

–Command Beep: The command beep parameter enables a short beep to give an audible feedback when a menu command is recognized. If this audible feedback is not desired, the command beep parameter should be programmed **OFF**.

- The settings for this parameter are **ON** and **OFF**.

–Language: The language parameter sets your preferred language dialog. This setting only effects the hand control language displayed.

- The settings for this parameter are **ENGLISH, GERMAN, FRENCH, ITALIAN,** and **SPANISH**. There may be more options in the future.

–Backlight: The backlight parameter sets the desired amount of illumination from the display.

- The settings for this value have a range of **5%—100%**.

–Dimming Delay: The dimming delay parameter allows you to set a time-out when the display gets dimmed. As soon as an input command is given the display will illuminate normally. This feature prevents disturbances in dark environments (e.g.: a cinema).

❍ The settings for this value have a range of **0—240 seconds**.

–**Measurement System:** Two metric systems are available:
–US (miles, mph)
–EU (km,km/h).

–Photo Album: The photo album parameter should be set to ENABLE for photo viewing on the LCD. If this parameter is set to DISABLE, the photo album will not be accessible on the LCD.

❍ The settings for this parameter are **ENABLE** or **DISABLE**.

–Time:

–Time Format: The time format parameter sets the format for the real-time clock on the main display.

❍ The settings for this parameter are **12h** or **24h**.

- ☐ **MOUSE**
  - ☐ **Profile**
  - ☐ **Mouse Command Beep**
  - ☐ **Scaling**
  - ☐ **Mouse ID**
  - ☐ **Mouse Interface**

–Profile: The profile parameter sets the operating mode of the IR mouse.

❍ The settings for this parameter are **SWITCHES, TOGGLE, AUTO**, and **HOLD**.
SWITCHES: Use the external switches of the power module to activate the left and right mouse buttons.
TOGGLE: Use left mouse button to toggle between mouse movement and mouse clicks.
AUTO: Same as toggle, but automatically returning back to mouse movement.
HOLD: Same as toggle, but mouse clicks are active only as long as button is being pressed.

–Mouse Command Beep: The mouse command beep parameter should be set to ON to activate a beep when switching between mouse movement and mouse clicks.

❍ The settings for this parameter are **ON** and **OFF**.

–Scaling: The scaling parameter defines the speed of the mouse.

❍ The settings for this parameter are **SLOW, MEDIUM,** and **FAST**.

–Mouse ID: The mouse ID parameter should be set to correspond to the ID of the GEWA adaptor.

❍ The settings for this parameter are **0** to **15**.

–Mouse Interface: The mouse interface parameter selects the communication link for the user's PC mouse.

❍ The settings for this parameter are **IR** or **BLUETOOTH**.

☐ **REMOTE CONTROL**
  ☐ **Keyfield 3 Direction Forward Select**
  ☐ **IR Learn Mode**

–Keyfield 3 Direction Forward Select: The keyfield 3 direction forward select parameter is applicable to navigating on a detail screen with 6 or 12 keys. When set to ON, the forward command will be interpreted as a select command.

❍ The settings for this parameter are **ON** or **OFF**.

–IR Learn Mode: When the IR learn mode parameter is set to ON, the specialty input (enhanced display module) is in learn mode, ready to directly “learn” IR codes from the user’s remote controls (TV, VCR, CD player, etc.).

RELATED PARAMETER: *Menu entry—IR learn mode must be enabled under system settings.*

❍ The settings for this parameter are **ON** or **OFF**.

☐ **MISCELLANEOUS**
  ☐ **On/Off Jack Supervision**
  ☐ **Mode Jack Supervision**
  ☐ **Mode Switch**
  ☐ **Mode Switch Timing**
  ☐ **Mode Jack**
  ☐ **Smart Switch**
  ☐ **Sleep Power Mode**

–On/Off Jack Supervision: The on/off jack supervision parameter can be used when an on/off switch is connected through the on/off jack. When programmed to YES, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** and **NO**.

–Mode Jack Supervision: The mode jack supervision parameter can be used when a mode switch is connected through the mode jack. When programmed to YES, it monitors whether the switch is connected; if the switch becomes disconnected, a warning is issued.

- The settings for this parameter are **YES** and **NO**.

–Mode Switch: In 3- and 4-switch head configuration, the select switch on the sub D-9 connector of the enhanced display can be used as an additional switch.

- The settings for this parameter are **MODE, TOGGLE,** or **SPECIAL.**
  MODE: In this position, a single activation of the switch is used as mode command
  TOGGLE: Use the switch to toggle direction (3-direction mode only).

  RELATED PARAMETER: *Alternative Controls>Specialty Input>Switched Input>Back Switch Toggle must be disabled for this to function.*

  SPECIAL: This configuration enables one switch to perform different commands:
    –Short Command: Toggle direction (3-direction mode only).

    RELATED PARAMETER: *Alternative Controls>Specialty Input>Switched Input>Back Switch Toggle must be disabled for this to function.*

    -Double Command: Change to standby select mode (*)
    -Long Command: Set system into sleep mode (**)

    (*) Only possible if standby select is on.
    (**) Only possible when sleep power mode is enabled.

–Mode Switch Timing: The mode switch timing parameter determines how long the mode key must be pressed to generate a "Mode Long" command. This parameter is only active when the Mode Key Navigation parameter is set to advanced; see System Settings>Miscellaneous menu.

- This settings for this parameter range from **200—4000 milliseconds**.

–Mode Jack: The mode jack parameter sets the mode jack of the hand control to be a N.O. (Normally Open) or a N.C. (Normally Closed) switch.

- The settings for this parameter are **N.O.** and **N.C.**

–Smart Switch: This parameter allows an on/off switch connected to the on/off jack of the enhanced display to be used as a "smart switch" (On/Off/Mode).

When the smart switch is enabled, a short command from this switch turns the system on. Each successive short command is a mode command, cycling to the next profile. A long command turns the system off. This means that when the smart switch is enabled, a long command over the on/off switch cannot be used to activate a system lock (see System Settings>Misc>System Lock for information of the lock feature). If a system lock is desired, it would have to be activated through an Aux menu.

***RELATED PARAMETER:** When smart switch is enabled, mode key navigation must be set to SIMPLE (System Settings>Misc>Mode Key Navigation).*

- The settings for this parameter are **ENABLED** or **DISABLED**.

–Sleep Power Mode: When enabled, the system will go into a sleep mode instead of shutting down completely in response to an off command. While in sleep mode, the LCD is dark. This feature is useful for chairs controlled by head arrays. The switches in the array are still active and as soon as one of them is contacted, the LCD will light up again and full function will return.

NOTE: Sleep mode is entered only when the off command comes from a switch connected to the on/off jack.

***RELATED PARAMETER:** The auto shutoff timer is still running while the system is in sleep mode. To let sleep mode continue indefinitely, disable the auto shutoff by setting it to 0 (System Settings>Timing>Auto Shutoff).*

- The settings for this parameter are **ON** or **OFF**.

IV. PROGRAMMING PARAMETERS

- ☐ SYSTEM SETTINGS
  - ☐ General Drive
    - ☐ Forward Tracking
    - ☐ Reverse Tracking
  - ☐ Reverse Beep
    - ☐ Profile 1,2,3,4,&5
  - ☐ Reminder
    - ☐ Display Time
    - ☐ Repetition Rate
    - ☐ Acoustical Feedback
    - ☐ Clear All Pending Reminders
    - ☐ Pending Reminders
    - ☐ Maintenance Reminder
      - ☐ Driven Distance
        - ☐ Driven Distance
        - ☐ Text
      - ☐ System Days
        - ☐ System Days
        - ☐ Text
        - ☐ Days
    - ☐ User Reminder
      - ☐ Access Hide User Reminders
      - ☐ Reminder 1-5
        - ☐ Type
        - ☐ Text
        - ☐ Interval
        - ☐ Time Hour
        - ☐ Time Minutes
  - ☐ Timing
    - ☐ Auto Shutoff
    - ☐ Latch Time-out
    - ☐ Latch Timeout Disable
  - ☐ Motors & Wheels
    - ☐ Polarity Inverted M1
    - ☐ Polarity Inverted M2
    - ☐ Motor Swap
    - ☐ Connector M1 Assign
    - ☐ Wheel Position
  - ☐ Battery
    - ☐ Type
  - ☐ Reset Distance
    - ☐ Reset Trip km
  - ☐ Miscellaneous
    - ☐ Save System Configuration
    - ☐ Symbols/Icons
      - ☐ Speed Pot
      - ☐ Speed Bar
      - ☐ Odometer
      - ☐ Trip Distance
      - ☐ Clock
    - ☐ System Lock
    - ☐ Menu Entries
      - ☐ IR Learn Mode
    - ☐ Mode Key Navigation
    - ☐ Profile Change Stop
    - ☐ Inhibit
    - ☐ Quick Access List
      - ☐ Clear
      - ☐ Freeze
    - ☐ Startup Profile

☐ **General Drive:**
–Forward/Reverse Tracking: The forward/reverse tracking parameters allow adjustment of straight forward and reverse driving. These parameters are used to compensate for small differences in the motors, tires, wheels, or power chair adjustment.

A positive value increases the left motor speed and decreases the right motor speed. A negative value increases the right motor speed and decreases the left motor speed. If the power chair is drifting to the left, increase the tracking value; if it is drifting to the right, decrease the tracking value. You have the ability to independently choose the tracking values for the forward and reverse directions.

○ The settings for this parameter range from **-50** to **+50**.

NOTE: Before changing the forward and reverse tracking, check the following factors that influence the ability of a power chair to travel in a straight line: tire pressure, caster tension adjustment, the weight distribution of the user, and the terrain over which the power chair travels. Check both tires have the correct air pressure as specified in the power chair owner's manual. Caster tension adjustment that is too loose will cause the casters to flutter at high speeds. Caster tension adjustment that is too tight will make the power chair hard to turn or not travel straight after coming out of a turn. If the occupant's weight is not centered from side to side, the power chair will veer. Traveling over terrain that is uneven or not level will require steering corrections by the operator in order to travel in a straight line.

☐ **Reverse Beep:** The reverse beep (backup alarm) parameter can be used to enable an acoustical warning while the chair is being driven in reverse. When it is enabled, the buzzer will sound Beep....Beep....Beep....etc. during reverse operation. The backup alarm can be individually set for each drive profile. Note that since this is a system parameter, it will effect each drive profile regardless of input device. In other words, every P1 in the system will or will not have a backup alarm.

○ The settings for this parameter are **ON** or **OFF** in each profile.

☐ **Reminder:** The reminder parameter is typically seen only if a hand control or enhanced display are in the system.
–Display Time: The display time parameter sets the amount of time a designated reminder will usually be displayed.

○ The settings for this parameter range from **1** to **30** seconds.

–Repetition Rate: The repetition rate parameter sets the amount of time an active reminder will continue to be displayed until cleared by the user.

○ The settings for this parameter range from **1** to **60** minutes.

–Acoustical Feedback: The acoustical feedback parameter assigns an audible tone to a reminder being displayed to inform the user a reminder is active.

○ The settings for this parameter are **ENABLED** or **DISABLED**.

–Clear All Pending Reminders: The clear all pending reminders parameter will clear all pending reminders stored in the system.

❍ The settings for this parameter are **YES** or **NO**.

–Pending Reminders: The pending reminders parameter allows you to see all of the user's pending reminders.

❍ The settings for this parameter are **YES** or **NO** to reset the selected reminder.

–Maintenence Reminder:

–Driven Distance

Driven Distance: The driven distance parameter sets the maintenence reminder by the total number of miles or kilometers the chair has been driven. This reminder is activated by the built-in odometer in the power module.

❍ The settings for this parameter are **DISABLED**, **KILOMETERS**, or **MILES**.

Text: The text parameter allows reminder display text to be selected (text can only be entered with the PCPS).

–System Days

System Days: The system days parameter enables the maintenance reminder to activate by a set number of days.

❍ The settings for this parameter are **DISABLED** or **ENABLED.**

Text: The text parameter allows reminder display text to be selected (text can only be entered with the PCPS).

Days: The days parameter designates the number of days until the reminder will be displayed.

❍ The settings for this parameter are **1** to **1000** days.

–User Reminder:

Access Hide User Reminders: The access hide user reminders parameter hides programmed reminders from appearing when they are scheduled.

–Reminder 1-5

Type: The type parameter defines the type of reminder to be displayed on the screen.

❍ The settings for this parameter are **DISABLED, INTERVAL,** and **TIME**.

Text: The text parameter allows reminder display text to be selected (text can only be entered with the PCPS).

Interval: The interval parameter sets the amount of minutes between reminder display.

❍ The settings for this parameter are **5** to **1440** minutes.

–Time Hour: The time hour parameter sets the hour of the day for the designated reminder to activate. This is based off of the internal real-time clock.

○ The settings for this parameter are **0** to **23** hours.

–Time Minutes: The time minutes parameter sets the time in minutes when the type is set to time for the user reminder. This is based off of the internal real-time clock.

○ The settings for this parameter are **0** to **55** minutes (in increments of five).

☐ **Timing:**

–Auto Shutoff: The auto shutoff parameter sets the time after which the system will turn off if no command has been given. Use this parameter to save energy. Setting this parameter to 0 disables the auto shutoff feature.

○ The settings for this parameter range from **0** to **240 minutes**.

–Latch Time-out: The latch time-out parameter defines the maximum time the speed will be latched after the last applied input signal when the chair is operating in latch mode. The chair will decelerate to a stop when the time-out expires if no input command has been given during this period. To maintain latched speed, the user simply gives repeated commands within the defined time-out period.

○ The settings for this parameter range from **5** to **120 seconds**.

–Latch Time-out Disable: The latch time-out disable parameter, if set to YES, disables the latch time-out parameter. The chair will not come to a stop if no input command is given during the latch timeout period.

☐ **Motors & Wheels:**

–Polarity Inverted M1 / M2: The polarity inverted M1/M2 parameter configures the polarity for the motor M1 and M2 ports of the power module. If this parameter is set to NO, the standard output is used (positive motor voltage = forward driving). If it is set to YES, the polarity is swapped to positive voltage = reverse driving. After changing this parameter, the correct driving direction of the power chair has to be checked.

○ The settings for this parameter are **YES** and **NO**.

–Motor Swap: The motor swap parameter configures the motor output assignment. If this parameter is set to NO, the standard configuration is used (M1 output = left motor and M2 = right motor). If it is set to YES, the outputs are swapped (M1 output = right motor and M2 = left motor). After changing this parameter, the correct driving direction of the power chair has to be checked.

○ The settings for this parameter are **YES** and **NO**.

–Connector M1 Assign: The connector M1 assign parameter defines which motor is connected to the M1 port of the power module.

○ The settings for this parameter are **LEFT** and **RIGHT**.

–Wheel Position: The wheel position parameter should be set according to the model of your power chair. Configurations are mid-wheel, front-wheel, and rear-wheel. The parameter affects the driving characteristics based on the power chair geometry.

- ○ The settings for this parameter are **REAR-WHEEL, MID-WHEEL,** and **FRONT-WHEEL.**

☐ **Battery:**

–Type: The type parameter should be set to the type of battery being used. The appropriate BDI algorithms to match these standard battery types are stored in the power base.

- ○ The settings for this parameter are **U1, NF-22, GROUP 24, GROUP 34,** and **3 custom selections (currently not being used)**.

☐ **Reset Distance:**

–Reset Trip: When the reset trip parameter is programmed ON, the trip meter reading is not stored on power down and starts at zero each time the system is powered up.

- ○ The settings for this parameter are **ON** and **OFF**.

☐ **Miscellaneous:**

–Save System Configuration: Select save system configuration in the menu to execute this function, which stores an inventory of all the connected modules. If any of these modules is later missing, the system will inform the user. Execute this function when removing modules from the system if not needed.

NOTE: Follow the instructions on the handheld programmer to execute this function.

–Symbols/Icons: Speed Pot, Speed Bar, Odometer, Trip Distance, and Clock: Enable any menu items you wish to be displayed on the color LCD. If any of the above selections are disabled, the respective menu item will not appear on the color LCD.

- ○ The settings for this parameter are **ENABLE** or **DISABLE**.

–System Lock: The system lock parameter enables the system lock feature. If the system is shut down using the system lock, the following procedure is required to turn it back on: activate an on command, then a forward command for at least 3 seconds until you hear a beep. Then activate a reverse command for at least 3 seconds until you hear a beep. The system lock provides a measure of security as the system cannot easily be turned on by a person unfamiliar with the protocol.

With the system lock on, there are two ways for the user to do a system lock: by holding the mode command until the system shuts down or by selecting the item System Lock in the Aux profile (if one is used).

RELATED PARAMETER: *If the smart switch is enabled (found in Enhanced Display Programming under Misc), the mode key navigation parameter must be set to SIMPLE.*

- ○ The settings for this parameter are **ON** or **OFF**.

–Menu Entries

IR Learn Mode: The IR learn mode parameter enables/disables main menu entry ‘IR learn mode’ on the LCD. If this parameter is set to DISABLE, changing of the parameter ‘IR learn mode’ will not be possible with the LCD.

❍ The settings for this parameter are **ENABLE** or **DISABLE**.

–Profile Change Stop: If the profile change stop parameter is enabled, a mode command will always stop the drive function. A second command will change the profile. If disabled, a mode command will allow you to change the profile while driving.

❍ The settings for this parameter are **ENABLE** or **DISABLE**.

–Mode Key Navigation: The mode key navigation parameter defines how the mode key operates.

SIMPLE = Each activation of the mode key cycles to the next profile. This is the standard setting.

ADVANCED = The mode key has two functions, depending on how long it is held down. A long mode command toggles between all the drive profiles (as a group) and the non-drive profiles. A short mode command cycles through the profiles within the drive group.

RELATED PARAMETER: *If the smart switch is enabled (found in Enhanced Display Programming under Misc), the mode key navigation must be set to SIMPLE.*

❍ The settings for this parameter are **SIMPLE** or **ADVANCED**.

–Inhibit: If the onboard charger pulls the inhibit low while charging, set the inhibit parameter to LOW ACTIVE. If the onboard charger pulls the inhibit high while charging, set this parameter to HIGH ACTIVE. In this case, the power base will inhibit driving. The onboard charger has to be connected to the 14-pin connector on the power base.

❍ The settings for this parameter are **LOW ACTIVE** and **HIGH ACTIVE**.

–Quick Access List:

Clear: Select clear in the quick access list submenu to clear the Aux screen’s existing quick access list.

NOTE: For this parameter, the handheld programmer will indicate the steps to follow to perform the clear function.

Freeze: Set the **Freeze** parameter to ON if you wish to freeze the Aux screen’s quick access list. Set it to OFF to enable dynamic adjustment to the list.

❍ The settings for this parameter are **ON** or **OFF**.

–Startup Profile: The startup profile parameter defines the profile the system will operate in when it is first powered up.

❍ The settings for this parameter are **LAST USED, P1, P2, P3, P4,** and **P5**.

SEAT PARAMETERS

This section includes all the programming parameters for units that have power actuators for seat functions.

WARNING! The centre of gravity of the power chair seating system was factory set to a position that meets the needs of the demographic majority of users. A Quantum Rehab Provider must evaluate the seating system and make any necessary adjustments to suit the specific requirements of the end user. No changes should be made to the seating configuration without first contacting Pride Mobility Products or the Quantum Rehab Provider.

- ☐ **SEAT**
  - ☐ **Actuators**
  - ☐ **Tilt Sensing**
    - ☐ **Tilt Threshold 1**
    - ☐ **Tilt Threshold 2**
    - ☐ **Tilt Threshold Driving 1**
    - ☐ **Tilt Threshold Driving 2**
    - ☐ **Tilt Threshold Driving 3**
    - ☐ **Tilt Threshold Head Control**
    - ☐ **Tilt Angle Definition**
    - ☐ **Tilt Angle Direction**
  - ☐ **Miscellaneous**
    - ☐ **Configuration Number**
    - ☐ **Latch Operation**
    - ☐ **12V Output**

–**Actuators:** A1 will be the settings for tilt, A2 will be the settings for recline, A3 will be the settings for elevate, A4 will be the settings for the left leg or foot platform, and A5 will be the settings for the right leg.

1. **Polarity:** The **Polarity** parameter configures the polarity of the actuator motor. If this parameter is set to OFF, the standard output is used (positive voltage = forward driving). If this parameter is set to ON, alternative output is used (positive voltage = reverse driving).

	A1	**A2**	**A3**	**A4**	**A5**
MAX SP	100	100	100	100	100
ACCEL	MED	MED	MED	MED	MED
DECEL	MED	MED	MED	MED	MED
TIMEOUT	120	120	120	120	120
POL. INV.	OFF	ON	OFF	OFF	OFF

Values: 0-255 Seconds:

Timeout: The timeout parameter defines the maximum run time of an actuator and raises a warning if the time has passed. -If latch operation is enabled, the parameter acts as a latch timeout and stops the actuators without any notification to the user.
–Setting the parameter to “O” disables the timeout.

❍ The settings for this parameter are **ON** and **OFF**.

2. **Max Speed:** The max speed parameter defines the maximum speed for the corresponding actuator in %. The parameter can be reduced to limit movement speed.

	A1	A2	A3	A4	A5
MAX SP	100	100	100	100	100
ACCEL	MED	MED	MED	MED	MED
DECEL	MED	MED	MED	MED	MED
TIMEOUT	120	120	120	120	120
POL. INV.	OFF	ON	OFF	OFF	OFF

- The settings for this parameter range from **20%—100%**.

3. **Acceleration:** The acceleration parameter defines how the actuator speeds up from zero to maximum speed. It can be set to LOW, MEDIUM or HIGH depending on the application.

	A1	A2	A3	A4	A5
MAX SP	100	100	100	100	100
ACCEL	MED	MED	MED	MED	MED
DECEL	MED	MED	MED	MED	MED
TIMEOUT	120	120	120	120	120
POL. INV.	OFF	ON	OFF	OFF	OFF

- The settings for this parameter are **LOW, MEDIUM,** and **HIGH**.

4. **Deceleration:** The deceleration parameter defines how the actuator slows down from maximum speed to zero speed. It can be set to LOW, MEDIUM or HIGH depending on the application.

	A1	A2	A3	A4	A5
MAX SP	100	100	100	100	100
ACCEL	MED	MED	MED	MED	MED
DECEL	MED	MED	MED	MED	MED
TIMEOUT	120	120	120	120	120
POL. INV.	OFF	ON	OFF	OFF	OFF

- The settings for this parameter are **LOW, MEDIUM,** and **HIGH**.

☐ **Tilt Sensing**

–Tilt Threshold 1 (Only used on multiple actuator power positioning systems that have an advanced actuator module): The tilt threshold 1 parameter sets the angle at which the tilt or recline will no longer go back when the power seat is elevated. The standard setting for this threshold is 25°.

❍ The settings for this parameter range from **10°—78°**.

–Tilt Threshold 2: The tilt threshold 2 parameter sets the angle at which the tilt or recline backward function is restricted. This parameter is useful to set for users that do not want the tilt to reach the full range of 55°. The standard setting for this threshold is 78°.

❍ The settings for this parameter range from **10°—78°**.

–Tilt Threshold Driving 1: The tilt threshold driving 1 parameter sets the angle at which the unit will enter a full drive lockout when tilting or reclining back. The standard setting for this threshold is 25°.

❍ The settings for this parameter range from **10°—78°**.

–Tilt Threshold Driving 2 (Only used on multiple actuator power positioning systems that have an advanced actuator module): The tilt threshold driving 2 parameter sets the angle that will restrict the power seat from elevating when already tilted or reclined. The standard setting for this threshold is 25°.

❍ The settings for this parameter range from **10°—78°**.

–Tilt Threshold Driving 3: This threshold is not used.

–Tilt Threshold Head Control: The tilt threshold head control parameter is only active if a head array is used as the input device, such as 3-switch head, 4-switch head, and 5-switch head. If this threshold is on and the tilt is beyond the set degree on this parameter, but below the degree set for tilt threshold driving, the driving will change from 3-, 4-, or 5-switch mode to 2-switch mode. This means forward and reverse driving will be controlled with the right head pad and left and right driving directions with the left head pad.

❍ The settings for this parameter range from **10°—78°**.

–Tilt Angle Definition: The tilt angle definition parameter defines the off-axis angle in degrees to the horizontal axis.

❍ The values for this parameter are **-90deg**, **0deg**, **+90deg**, and **180deg**.

–Tilt Angle Direction: The tilt angle direction parameter defines the increasing direction of the angle (seen from the backside of the AAM case).

❍ The values for this parameter are **CLOCKWISE** and **COUNTERCLOCKWISE**.

☐ **Miscellaneous:**

–Configuration Number: The configuration number parameter sets which of the 39 possible combinations of actuators will be used (see configuration table). If you add or remove an actuator, you will need to reset this parameter to match the new configuration.

- The settings for this parameter range from **1** to **39**.

–12V Output: The 12V output parameter enables or disables the 12V DC output on the AAM.

- The settings for this parameter are **ON** or **OFF**.

–Latch Operation: The latch operation parameter sets all of the seat functions to operate in latch mode. When the latch operation parameter is set to OFF, the motors operate only when the input command is present. With the latch operation parameter set to ON, the motors will continue to run even if the input command is removed. The motors will stop when a new command is entered, when current output limit is reached, or a movement limit is reached when the power chair seating system is equipped with movement limit switches.

- The settings for this parameter are **ON** or **OFF**.

WARNING! Do not enable latch mode unless the power chair operator can safely operate the necessary input device(s), and has shown a consistent ability to do so!

Settings for Seat Configuration Parameter

	ACTUATOR 1	ACTUATOR 2	ACTUATOR 3	ACTUATOR 4	ACTUATOR 5
SETTING	TILT	RECLINE	ELEVATE	LEFT LEG (LL), BOTH LEGS (2L), OR FOOT PLATFORM	RIGHT LEG (RL) OR BACK
1				LL	RL
2				2L	
3				FP	
4			E		
5			E	LL	RL
6			E	2L	
7			E	FP	
8		R			
9		R		LL	RL
10		R		2L	
11		R		FP	
12		R		2L	B
13		R		FP	B
14		R	E		
15		R	E	LL	RL
16		R	E	2L	
17		R	E	FP	
18		R	E	2L	B
19		R	E	FP	B
20	T				
21	T			LL	RL
22	T			2L	
23	T			FP	
24	T		E		
25	T		E	LL	RL
26	T		E	2L	
27	T		E	FP	
28	T	R			
29	T	R		LL	RL
30	T	R		2L	
31	T	R		FP	
32	T	R		2L	B
33	T	R		FP	B
34	T	R	E		
35	T	R	E	LL	RL
36	T	R	E	2L	
37	T	R	E	FP	
38	T	R	E	2L	B
39	T	R	E	FP	B

NOTE: Settings with Recline and Legs/Foot Platform will work simultaneously or independently of each other.

DIAGNOSTICS

The Q-Logic control system detects a wide variety of error conditions and communicates information about them in a clear and straightforward way.

When an error occurs, the LCD screen on the hand control or on the Enhanced Display presents a message describing the condition: including whether it is warning, a fault that the user can fix, or a serious error requiring a service technician. The error message will include the identification number of the specific error that has occurred.

Warnings

The LCD displays a short description of the warning in a pop-up window. After 2 seconds, the pop-up window disappears. It will continue to pop up once a minute, for 2 seconds, as long as the warning condition is present. In addition, the horn will sound a double beep, once each minute.

Examples of warnings are #105 Low Battery Voltage or #110 High Pedal Warning (an active direction command already applied when the chair is first powered on).

Recoverable Faults

The LCD displays a short description of the fault in a pop-up window, which remains on the screen until the error is corrected. The message typically describes how to correct the error, which often includes cycling power. The horn will sound twice a second continuously until the error is corrected.

As an example, if #110 High Pedal Warning is not corrected within five seconds (by returning the direction input command to neutral), the warning changes to a recoverable fault: #36 Joystick Not Centered. The message displayed in the popup window tells the user that the joystick must be returned to center and that it will be necessary to turn the power off and back on again.

Serious Errors

For these errors, the user must contact the dealer because these are faults that the user cannot correct. However, sometimes the fault circuits catch a temporary or extreme event that is not a true fault in the system. Turning the power off and back on again will allow the user to determine whether a serious error in fact exists.

As with the recoverable faults, the horn will sound twice a second continuously until the error is corrected (or the system is turned off).

If the input device is a Standalone Joystick with no Enhanced Display, the LEDs on the SAJ are used to convey fault information. For more information, including the error number, a programmer must be connected to the system.

TROUBLESHOOTING

Look up the error number on the following chart for suggestions on how to correct the error. The problem may be as simple as a loose connection or faulty wiring that can be easily fixed. Others can be fixed by reinstalling the software. Some require replacement of a defective part.

- Cycle the on/off switch as the first step; this may clear the error.
- If you are unable to remedy the error, contact: Quantum Rehab Technical Support, at 866-800-2002.

#	ERROR CODE	DIAGNOSIS	SOLUTION
1–17	SW Fault	Software error.	Update software.
19	Communication Fault: NM protocol fatal error	Communication to a module over system bus has failed.	Check bus cables. Check if a fatal error occurred on another module. If necessary, replace this module or update the software.
20	SW Fault: wrong profile version of remote device	Incompatible module connected.	Remove incompatible module or update the software.
21	SW Fault: CMM error, pool empty	Module out of resources.	Remove one or more modules.
22	SW Fault: A/D conversion timeout	Software error.	Replace module (see error history).
23	Communication Fault: more than 1 active power flip flop	Bus cable unplugged while driving; bus cable defective; or hardware failure.	Check bus cables. Unplug device after device from bus until fault is recovered.
24	SW Fault: CMM stopping not received	Communication to a module over system bus has failed; or a module (not the powerbase) created a critical failure.	Check bus cables. Check if a fatal error occurred on another module. If necessary, replace this module or update the software.
26–34	SW Fault	Software error.	Update software.
35	Joystick Center Fault	Joystick disconnected or defective.	Check if joystick is connected. Replace joystick. Replace module.
36	Joystick Not Centered	Joystick out of center position for >5 sec after power up.	Release joystick or other input command. Cycle on/off switch.
37	Joystick Connection	Joystick disconnected or defective.	Check if joystick is connected. Replace joystick. Replace module.
38	Joystick Out of Range	Limiter plate changed; limiter plate defective; or joystick is not or is badly calibrated.	Calibrate joystick. Replace joystick. Replace module.
39	Joystick Signal Fault	Joystick disconnected or defective.	Check if joystick is connected. Replace joystick. Replace module.
40	Communication Fault: timeout for output DF	Bus cable unplugged while driving; bus cable defective; or hardware defective.	Check bus cables. Check if a fatal error occurred on another module. If necessary, replace this module or update the software. Unplug module after module from bus until fault is recovered.
41–43	SW Fault	Software error.	Update software.
44	Limit Sense Pots Open	Position feedback wiring open.	Check position feedback connector and wiring. Check position feedback devices.
45	Limit Sense Pots Shorted	Position feedback wiring shorted.	(Same as #44.)
46	High Battery Voltage	Battery voltage too high.	Disconnect charger.

#	ERROR CODE	DIAGNOSIS	SOLUTION
47	Low Battery Voltage	Battery voltage too low.	Charge battery.
48	Temperature Out of Range	Temp. outside operating range.	Let system cool down (wait 15 minutes).
49	Motor 1 Not Connected: resistance too high	Motor connector unplugged; motor wiring open; or defective motor.	Check motor brake connector. Check motor wiring. Check motor resistance and current. Decrease motor resistance: use a motor with a smaller resistance or add a parallel resistor. Replace motor.
50	Motor 2 Not Connected: resistance too high	(Same as #49.)	(Same as #49.)
51	Motor 3 Not Connected: resistance too high	(Same as #49.)	(Same as #49.)
52	Motor 4 Not Connected: resistance too high	(Same as #49.)	(Same as #49.)
53	Motor 5 Not Connected: resistance too high	(Same as #49.)	(Same as #49.)
54	Motor Overcurrent	Motor overloaded or stalled; short in actuator or wiring; or defective motor.	Check motor wiring. Check motor resistance and current. Replace motor.
55	Motor Timeout	Motor operated in one direction longer than the programmed limit.	Increase the value of the Timeout parameter (this is an OEM parameter).
56	Sensor Reference Fault	Pressure sensor defective.	Replace device.
57	SW Fault: buffer empty or overflow	Module out of resources.	Update software.
58	EEPROM Fault: CRC of profile section is incorrect	Data in the nonvolatile memory is incorrect.	Replace module.
59	EEPROM Fault: CRC of calibration section is incorrect	Data in the nonvolatile memory is incorrect.	Replace module.
60	EEPROM Fault: CRC of calibration section is incorrect	Data in the nonvolatile memory is incorrect.	Download parameter file with the PCPS (Activate Advanced Cloning).
61	EEPROM Fault: CRC of critical section is incorrect	Data in the nonvolatile memory is incorrect.	Download parameter file with the PCPS (Activate Advanced Cloning).
62	EEPROM Fault: CRC of uncritical section is incorrect	Data in the nonvolatile memory is incorrect.	Download parameter file with the PCPS (Activate Advanced Cloning).
63	EEPROM Fault: E2PROM parameter disturbed	A parameter value is out of range.	Download parameter file with the PCPS (Activate Advanced Cloning).

#	ERROR CODE	DIAGNOSIS	SOLUTION
64	EEPROM Fault: E2PROM parameter disturbed in critical section	A parameter value is out of range.	Download parameter file with the PCPS (Activate Advanced Cloning).
65	DMS Fault: inactive input device not centered	Inactive input device not centered; bus cable defective; or hardware failure.	Release inactive input device. Check bus cables. Unplug device after device from bus until fault is recovered.
69	Bus Overload: bus B+ fuse has tripped	Bus supply is overloaded.	Check bus cables. Unplug device after device from bus until fault is recovered.
70	Hardware Fault: CRC of ROM incorrect	The continuous check of the program memory has detected an error.	Update software with the PCPS (Inhibit Application Start and download compatible software). Replace module.
73	Precharge Fault: H-bridge voltage does not reach battery voltage	The supervision of a module function has detected an error.	Replace powerbase.
74	Left Motor Disconnected: left motor current is too low	Motor connector unplugged; motor wiring open; or defective motor.	Check motor-brake connector. Check motor wiring. Check motor resistance and current. Replace motor.
75	Right Motor Disconnected	(Same as #74.)	(Same as #74.)
80	Main Relay Not Open	Main relay contact is welded.	Replace powerbase.
81	Left Motor Shorted	Short in motor or wiring.	Check motor-brake connector. Check motor wiring. Check motor resistance and current.
82	Right Motor Shorted	Short in motor or wiring.	(Same as #81.)
83	Left Brake Disconnected: left brake current is too low	Motor connector unplugged; brake wiring open; brake defective; or brake voltage set too low.	Check motor-brake connector. Check brake wiring. Check brake resistance. Increase value of Brake Voltage parameter (this is an OEM parameter).
84	Right Brake Disconnected	(Same as #83.)	(Same as #83.)
85	Left Brake Overload: left brake Brake current is too high	Brake wiring shorted; or brake defective.	Check motor-brake connector. Check brake wiring. Check brake resistance. Replace motor.
86	Right Brake Overload	(Same as #85.)	(Same as #85.)
87	Left Brake Not Released: left brake voltage is too low	Brake wiring open; brake defective; battery voltage below nominal operating range limit; or brake voltage is set too low.	Check motor-brake connector. Check brake wiring. Check brake resistance. Charge battery. Increase value of Brake Voltage parameter. Replace brake.

#	ERROR CODE	DIAGNOSIS	SOLUTION
88	Right Brake Not Released	(Same as #87.)	(Same as #87.)
89	Left Brake Fault: voltage too high	Motor connector unplugged; brake wiring open or shorted; brake defective.	Check motor-brake connector. Check brake wiring. Check brake resistance. Replace brake.
90	Right Brake Fault: voltage too high	(Same as #89.)	(Same as #89.)
94	Main Relay Not Closed	Supervision of a module function has detected an error.	Replace power module.
96	Current Sense Fault: current sense measurement left out-of-range	Supervision of a module function has detected an error.	Replace power module.
97	Current Sense Fault: current sense measurement right out-of-range	Supervision of a module function has detected an error.	Replace power module.
98	Overtemperature: heatsink too hot	Constant high load made the temperature reach the maximum limit; or excessive load on outputs.	Let system cool down (wait 15 minutes). Check output currents.
99	High Motor Temperature	Estimated motor temperature is too high; the parameters for the motor temperature estimation are not set optimally.	Let system cool down (wait 15 minutes). Check output currents. Check the parameters for the motor temp estimation (these are OEM parameters).
100	Battery Overvoltage	A downhill ride with fully charged batteries.	Do not drive downhill with fully charged batteries. Continue downhill ride at reduced speed. (This error is at the Warning level.)
101	Battery Undervoltage	Battery voltage below the lower operating range limit, or empty.	Charge battery. (This error is at the Warning level)
102	High Temperature: heatsink hot	A constant high load has overheated the Powerbase; excessive load on outputs.	Check output currents.
104	High Battery Voltage	A downhill ride with fully charged batteries.	Do not drive downhill with fully charged batteries. Continue downhill ride at reduced speed. (This error is at the Recoverable Fault level.)
105	Low Battery Voltage	Battery voltage below the lower operating range limit, or empty.	Charge battery. (This error is at the Recoverable Fault level.)
107	Charger/Drive Inhibit: driving inhibited due to low voltage on DMS line	Charger plugged in while driving; attempting to start while charger connected; deadman switch line (DMS) inhibits driving; or bus cable defective.	Disconnect charger. Check inhibiting modules. Unplug module after module from bus until fault is recovered. Check bus cables.

#	ERROR CODE	DIAGNOSIS	SOLUTION
109	Communication Fault: drive command missing (Timeout CAN message)	Bus cable unplugged while driving, or bus cable defective	Check bus cables.
110	High Pedal Protection: joystick out-of-center position during power up	Input command not zero during power up.	Release joystick. Release input command.
111	Center Detect Fault: center detect is not active when JS in center position	Joystick disconnected or defective.	Check if joystick cable is connected. Replace joystick. Replace module.
112	Center Detect Fault: center detect is active when JS is not centered	Joystick disconnected or defective.	Check if joystick cable is connected. Replace joystick. Replace module.
121	Communication Fault: input device failed	Bus cable unplugged while driving; bus cable defective; or periodic module supervision has detected breakdown of a module.	Check bus cables. Check if a fatal error occurred on another module. If necessary, replace this module or update the software. Unplug module after module from bus until fault is recovered.
122	SW Fault: overtake abort	Generic software fault.	Defective software; replace module. (See error history to determine which module caused the error.)
123	SW Fault: unresolvable duplicate output definition in system	Multiple modules of the same kind, which are only allowed to exist once in the system.	Remove duplicate modules, leaving just one unique module in the system.
124	SW Fault: unresolvable duplicate input definition in system	(Same as #123.)	(Same as #123.)
125	SW Fault: requested output definition not found	Communication to a module over the system bus has failed.	Check if a fatal error occurred on another module. If necessary, replace this module or update the software.
126	SW Fault: start of output failed	(Same as #125.)	(Same as #125.)
127	SW Fault: general menu error	The module whose function was just active, or was just activated, has failed.	Check if a fatal error occurred on another module. If necessary, replace this module or update the software.
128	Motor Control Warning: motor control loop is not stable	The control parameters do not match the motors being used; motor impedance parameter is set too high; or defective motor.	Download parameter file with PCPS (Activate Advanced Cloning). Check Motor Impedance parameter and decrease value if necessary (this is an OEM parameter). Replace motor.
129	Communication Fault: Y-dataflow timout	Bus cable unplugged while driving; bus cable defective; or hardware failure.	Check bus cables. Replace defective bus cable or hardware.
130	SW Fault: general SDO client error	Generic software error.	Remove one or more modules. If error persists, contact Quantum Rehab.

#	ERROR CODE	DIAGNOSIS	SOLUTION
131	Left Motor Output Fault: Incorrect output voltage	Motor connector unplugged; motor wiring open; short in motor or wiring; or power module failure.	Check motor wiring. Replace motor. Replace power module.
132	Right Motor Output Fault	See Error Code # 131.	See Error Code #131.
133	EEPROM Fault: incorrect CRC of BDI section	Data in the nonvolatile memory is incorrect.	Note: BDI will automatically reset to 100%. Update module software. Replace module if this error occurs periodically. (Check error history.)
134	High Pedal Fault	Input command is not zero during power up.	Release input command. Cycle on/off switch.
135	Direction Assignment Error	Two commands assigned for the same direction.	Reassign directions.
136	Incompatible Device Connected: wrong protocol version of remote device	Incompatible module connected.	Remove incompatible module or update software.
137	Incompatible Device Connected: invalid device type or serial number	Incompatible module connected, or a module (other than the Powerbase) created a critical failure.	Unplug module after module from bus until fault is recovered. Check if a fatal error occurred on another module. If necessary, replace this module or update the software.
138	Main Relay Not Open: main relay not open during initial test	Charger connected; battery voltage below nominal operating range limit; or main relay contact is welded.	Disconnect charger. Charge battery. Replace power module.
139	Communication Fault: CAN bus off	Bus cable defective, or hardware failure.	Check bus cables. Unplug module after module from bus until fault is recovered.
140	Controller Power Down Fault: internal controller supply remains active when switched off	Supervision of a module function has detected an error.	Disconnect and reconnect battery. Replace power module.
141	Drive Restricted	Driving restriction active.	Clear restrictions.
142	Current Offset Calibration Left: current offset Left is out of limit	Supervision of a module function has detected an error.	Replace power module if this error occurs periodically.
143	Current Offset Calibration Right	(Same as #142.)	(Same as #142.)
144	Puff Parameters Overlap	Puff parameters are over-lapping (4-pressure setup).	Adjust parameters.
145	Sip Parameters Overlap	Puff parameters are over-lapping (4-pressure setup).	Adjust parameters.
149	Open Wire in Indicator Left Circuit	Indicator bulb blown, or indicator not connected.	Check indicator wiring.
150	Open Wire in Indicator Right Circuit	(Same as #149.)	(Same as #149.)
151	Open Wire in Light (L/R) Circuit	Light bulb blown, or light not connected.	Check light bulb. Check light wiring.

#	ERROR CODE	DIAGNOSIS	SOLUTION
155	EEPROM Fault: CRC of config section is incorrect	Data in the nonvolatile memory is incorrect.	Set the configuration data with the help of the PCPS (OEM only). Replace power module.
156	SW Fault: unexpected interrupt	The microcontroller system has triggered an unexpected interrupt.	Replace power module if this error occurs periodically.
157	SW Fault: out of window range	Incompatible module connected.	Remove incompatible module or update software.
160	Set Recline to Vertical Position First!	Recline is not in down position.	Move recline to down position.
161	Set Standup to Down Position!	Standup is not in down position.	Move standup to down position.
163	One or More Initial Tests Not Processed	Not all initialize tests were processed.	Replace power module if this error occurs periodically.
164	Invalid Configuration	Invalid value(s) in config section.	Set the configuration data with the help of the PCPS.
166	EEPROM Fault: CRC of distance section is incorrect.	Distance values are corrupted.	Note: This fault automatically resets the trip counters. Replace power module if this error occurs periodically.
167	Brake Switch Opened During Idle	Brake switch is either open or not connected.	Close brake switch. Check brake wiring.
174	Memory Full: Code Could Not Be Saved	Not enough memory available (e.g., while learning IR codes).	Delete unused data in data section.
175	Memory Full: User-Defined Menu Too Big	Memory holding dynamic protocoltable is full.	Update software. Replace power module.
176	Learning of IR Code Failed. Retry.	Incorrect positioning of remote control device.	Try again with the remote control device in a different position.
177	Motor 6 Not Connected: resistance too high	Motor connector unplugged; motor wiring open; or defective motor.	Check motor brake connector. Check motor wiring. Check motor resistance and current. Decrease motor resistance, by using a motor with a smaller resistance or by adding a resistor in parallel with motor.
181	Speed Potentiometer Out of Range	Invalid speed pot connection.	Replace hand control.
192	Motor 1 Disconnected	Motor connector unplugged; motor wiring open; or defective motor.	Check motor brake connector. Check motor wiring. Check motor resistance and current. Replace motor.
193	Motor 2 Disconnected	(Same as #192.)	(Same as #192.)
194	Motor 1 Shorted	Short in motor or wiring.	Check motor brake connector. Check motor wiring. Check motor resistance and current.
195	Motor 2 Shorted	(Same as #194.)	(Same as #194.)
196	Current Offset Calibration Motor 1	Current offset of Motor 1 is outside the allowable limits.	Replace power module.
197	Current Offset Calibration Motor 2	(Same as #196.)	(Same as #196.)

#	ERROR CODE	DIAGNOSIS	SOLUTION
198	Current Sense Fault: Motor 1	Current measurement of Motor 1 is out of range.	Replace power module.
199	Current Sense Fault: Motor 2	(Same as #198.)	(Same as #198.)
200	Motor 1 Output Fault: output voltage is incorrect	Motor connector unplugged; motor wiring open; short in motor or wiring; or controller failure.	Check motor wiring. Replace power module. Replace motor.
201	Motor 2 Output Fault	(Same as #200.)	(Same as #200.)
203	Brake 1 Disconnected	Motor connector unplugged; brake wiring open; brake defective; or brake voltage set too low.	Check motor brake connector. Check brake wiring. Check brake resistance. Increase the Brake Voltage parameter (this is an OEM parameter). Replace brake.
204	Brake 2 Disconnected	(Same as #203.)	(Same as #203.)
205	Brake Driver Defective	Brake fault input high.	Replace power module.
206	Hardware Fault: oscillator failure	Hardware failure.	Replace AAM.
207	On/Off Switch Disconnected	On/off switch disconnected while system is running.	Reconnect on/off switch.
208	Brake 1 Overload: current too high	Brake wiring shorted, or brake defective.	Check motor brake connector. Check brake wiring. Check brake resistance. Replace brake.
209	Brake 2 Overload: current too high	(Same as #200.)	(Same as #200.)
210	EEPROM Fault: CRC of poti section is incorrect	Data in the nonvolatile memory is incorrect.	Recalibrate potentiometer.
211	Poti Value Out Of Range	Poti calibration is invalid.	Recalibrate poti.
217	Actuator Overcurrent	Short in actuator or wiring; or actuator overload.	Check actuator wiring. Check actuator resistance and current.
218	Actuator Timeout	Actuator operated too long in one direction.	Release input command.
219	Reference Voltage Failed	Reference voltage failed.	Replace power module.
221	Mode Switch Disconnected	Mode switch disconnected.	Reconnect Mode switch. If supervision not required, deactivate the Mode Jack Supervision parameter.
222	Hand control Missing or Defective	Hand control not connected or defective; or wrong system configuration data.	Reconnect hand control. Replace hand control. Execute Save System Configuration function.
223	Standalone Missing or Defective	SAJ not connected or defective; or wrong system configuration data.	Reconnect SAJ. Replace SAJ. Save System Configuration.
224	Attendant Missing or Defective	Attendant Joystick not connected or defective; or wrong system configuration data.	Reconnect Attendant Joystick. Replace Attendant Joystick. Execute Save System Configuration function.

#	ERROR CODE	DIAGNOSIS	SOLUTION
225	Advanced Actuator Module Missing or Defective	AAM not connected or defective; or wrong system configuration data.	Reconnect AAM. Replace AAM. Execute Save System Configuration function.
226	Enhanced Display Missing or Defective	Enhanced Display not connected or defective; or wrong system configuration data.	Reconnect Enhanced Display. Replace Enhanced Display. Execute Save System Configuration function.
227	Sip&Puff Module Missing or Defective	S&P not connected or defective; or wrong system configuration data.	Reconnect S&P. Replace S&P. Execute Save System Configuration function.
228	ECU Missing or Defective	ECU not connected or defective; or wrong system configuration data.	Reconnect ECU. Replace ECU. Execute Save System Configuration function.
229	Module Missing or Defective	Device not connected or defective; wrong system configuration data.	Reconnect device. Replace device. Execute Save System Configuration function.
230	Hardware Fault: charge pump defective	Supervision of a module function has deteceted an error.	Replace power module.
231	Input Device Not Active	Input device not properly centered.	Release any inactive devices. Unplug module after module from bus until fault is recovered. Check joystick cable connection. Replace joystick. Replace module.
234	Incompatible Module Connected	Incompatible module connected.	Remove incompatible module or update software.
237	Start Manager Update	Start manager not updated.	Update start manager.

PROGRAMMERS

The Q-Logic system is programmable: this means that the settings of the various programmable parameters can be adjusted by means of a programming device. Two programmers are available: the PC Programming Station (PCPS) and the handheld programmer. The PCPS has features not available with the handheld programmer; on the other hand, the handheld programmer has the advantage of being more portable. Typically, the PCPS is used to set up the parameters initially and the handheld programmer is used to make adjustments in the field.

Handheld Programmer

The handheld programmer (see figure 22) provides programming, diagnostic, and test capabilities for the Q-Logic system. The programmer can be plugged into either of two programmer ports, one located on the hand control and the other on the Enhanced Display.

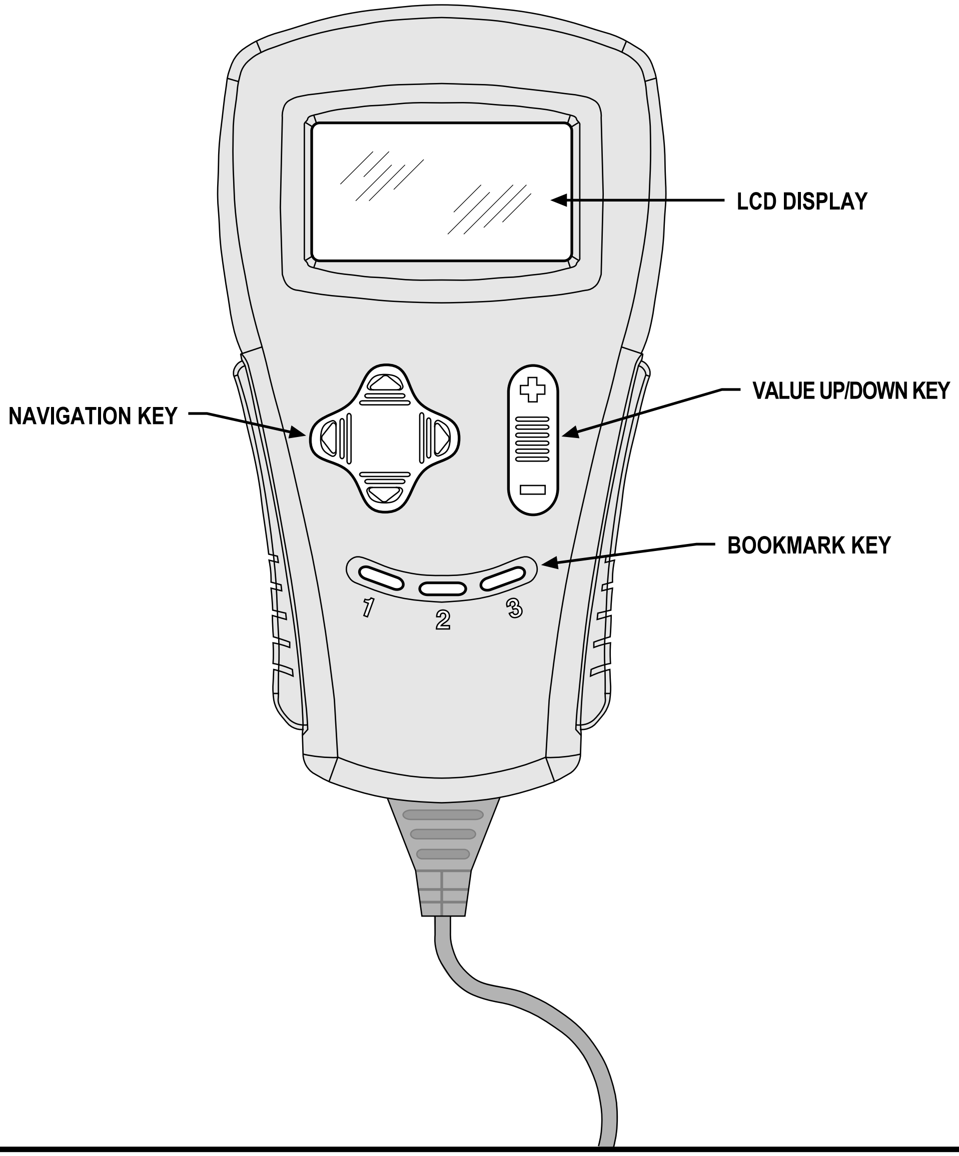


Figure 22. Handheld Programmer

Programmer Operation

The handheld programmer is easy to use, with self-explanatory functions. After plugging in the programmer, wait a few seconds for it to boot up and gather information from the system.

For experimenting with settings, the programmer can be left plugged in while the chair is driven.

The bookmark keys can make parameter adjustment more convenient. To set a bookmark, press one of the three bookmark keys for more than two seconds. To jump to a bookmarked location, press the appropriate bookmark key quickly (for less than two seconds).

The bookmark keys also have another function. When setting the value of a parameter, you can use these keys to adjust the increments by which the value changes-with Bookmark Key 1 pressed, the value changes in 10 digit steps up or down; with Bookmark Key 2 pressed, the value changes in 100 digit steps; and with Bookmark Key 3, in 1000 digit steps-which for most parameters, takes you from the maximum to the minimum value, or vice versa.

Programmer Menus

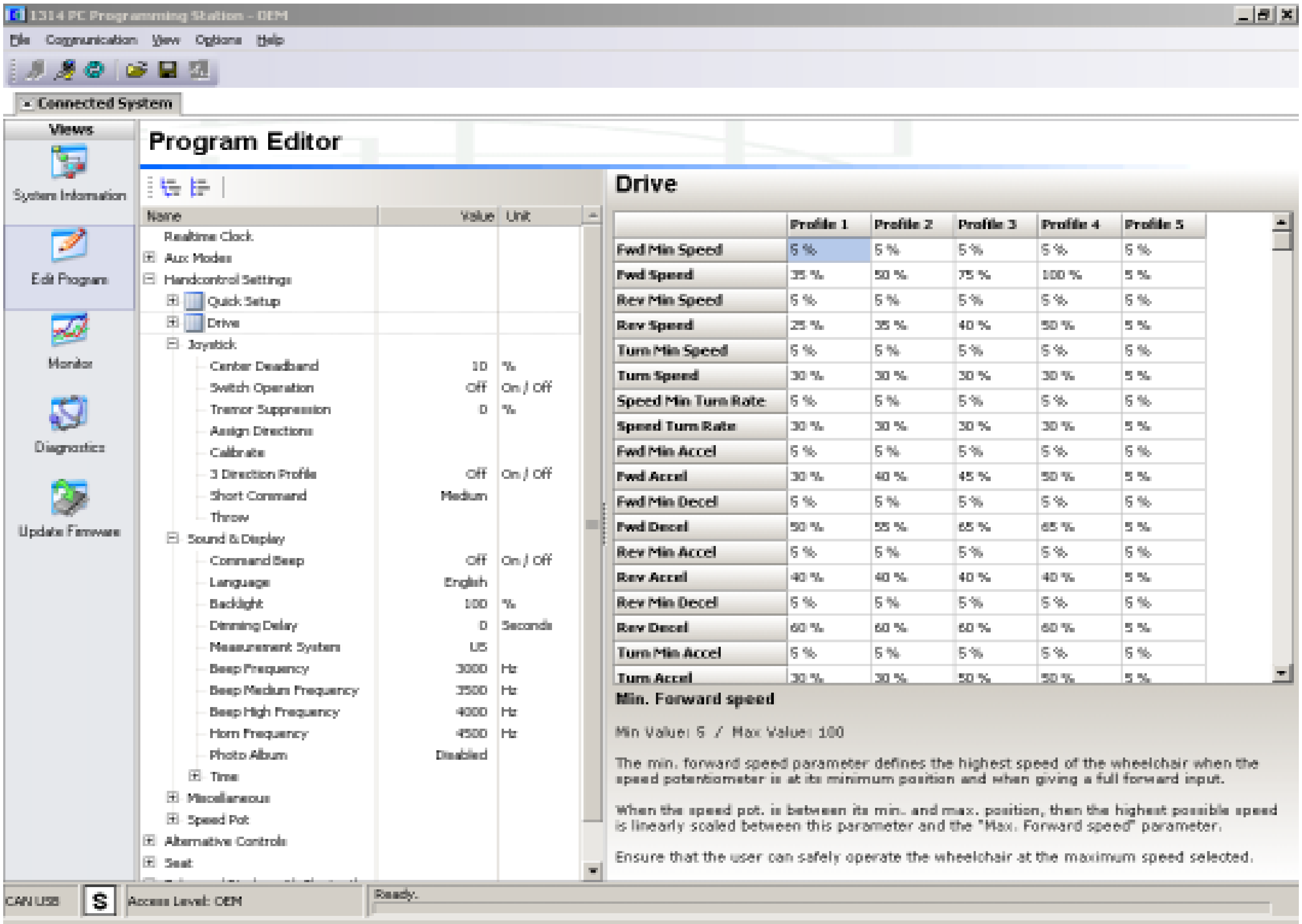
There are six main menus, which in turn lead to nested submenus:

- **Hand Control Settings**—provide access to the individual programmable parameters for the hand control.
- **Alternative Controls**—provide access to the individual programmable parameters for the Stand-alone Joystick, Attendant Control, Sip & Puff, and Specialty Input.
- **Enhanced Display**—provides access to the individual programmable parameters for the Enhanced Display module.
- **System Settings—**provide access to the individual system-wide programmable parameters.
- **Seat**—provides access to the individual programmable parameters for the AAM module.
- **Diagnostics—**present real-time values during chair operation, and also detailed error information, including error history files.

Only the applicable menus will appear on the programmer. For example, if there is no AAM in the system, the Seat menu will not appear. The System Settings and Diagnostics menus always are available.

PC PROGRAMMING STATION (PCPS)

The PCPS is used mainly at the OEM and dealer sites. It is an MS-Windows 32-bit application that runs on a standard Windows PC. The PCPS can do everything the handheld programmer can do, and more. Parameters can be adjusted in matrixes that present a whole family of parameters. For example, here are the hand control parameters:



Name	Value	Unit
Realtime Clock		
⊞ Aux Modes		
⊟ Handcontrol Settings		
⊞ Quick Setup		
⊞ Drive		
⊟ Joystick		
Center Deadband	10	%
Switch Operation	Off	On / Off
Tremor Suppression	0	%
Assign Directions		
Calibrate		
3 Direction Profile	Off	On / Off
Short Command	Medium	
Throw		
⊟ Sound & Display		
Command Beep	Off	On / Off
Language	English	
Backlight	100	%
Dimming Delay	0	Seconds
Measurement System	US	
Beep Frequency	3000	Hz
Beep Medium Frequency	3500	Hz
Beep High Frequency	4000	Hz
Horn Frequency	4500	Hz
Photo Album	Disabled	
⊞ Time		
⊞ Miscellaneous		
⊞ Speed Pot		
⊞ Alternative Controls		
⊞ Seat		

	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Fwd Min Speed	5 %	5 %	5 %	5 %	5 %
Fwd Speed	35 %	50 %	75 %	100 %	5 %
Rev Min Speed	5 %	5 %	5 %	5 %	5 %
Rev Speed	25 %	35 %	40 %	50 %	5 %
Turn Min Speed	5 %	5 %	5 %	5 %	5 %
Turn Speed	30 %	30 %	30 %	30 %	5 %
Speed Min Turn Rate	5 %	5 %	5 %	5 %	5 %
Speed Turn Rate	30 %	30 %	30 %	30 %	5 %
Fwd Min Accel	5 %	5 %	5 %	5 %	5 %
Fwd Accel	30 %	40 %	45 %	50 %	5 %
Fwd Min Decel	5 %	5 %	5 %	5 %	5 %
Fwd Decel	50 %	55 %	65 %	65 %	5 %
Rev Min Accel	5 %	5 %	5 %	5 %	5 %
Rev Accel	40 %	40 %	40 %	40 %	5 %
Rev Min Decel	5 %	5 %	5 %	5 %	5 %
Rev Decel	60 %	60 %	60 %	60 %	5 %
Turn Min Accel	5 %	5 %	5 %	5 %	5 %
Turn Accel	30 %	30 %	50 %	50 %	5 %

Min. Forward speed

Min Value: 5 / Max Value: 100

The min. forward speed parameter defines the highest speed of the wheelchair when the speed potentiometer is at its minimum position and when giving a full forward input.

When the speed pot. is between its min. and max. position, then the highest possible speed is linearly scaled between this parameter and the "Max. Forward speed" parameter.

Ensure that the user can safely operate the wheelchair at the maximum speed selected.

Clicking on any of the parameters brings up a description.

The PCPS also has additional capabilities, including: saving/restoring sets of parameters to/from disk, updating Q-Logic software, and programming IR remote controls.

For more information, see the instructions included with the PCPS software.

APPENDIX B

SYSTEM SPECIFICATIONS

Battery

Nominal supply voltage	24 V
Operating voltage range	16 - 33 V
Maximum voltage (no damage to modules)	35 V

Bus

Maximum bus length	10 m
Maximum number of modules	10
Continuous power	13 A

Environment

Ambient operating temperature range	-25°C - 50°C
Storage temperature range	-40°C - 70°C
Ambient operation humidity range	0 - 95% RH

INPUT DEVICE INSTALLATION AND WIRING

The input devices are designed specifically for easy installation and removal.

Q-Logic Hand Control

The hand control is mounted to the controller bracket with four bolts. A programmer/charger port is located on the underside of the module, as are two covered parallel jack for remote mode and on/off switches. The 1 meter flying lead ends in a Molex 6-pin BUS connector.

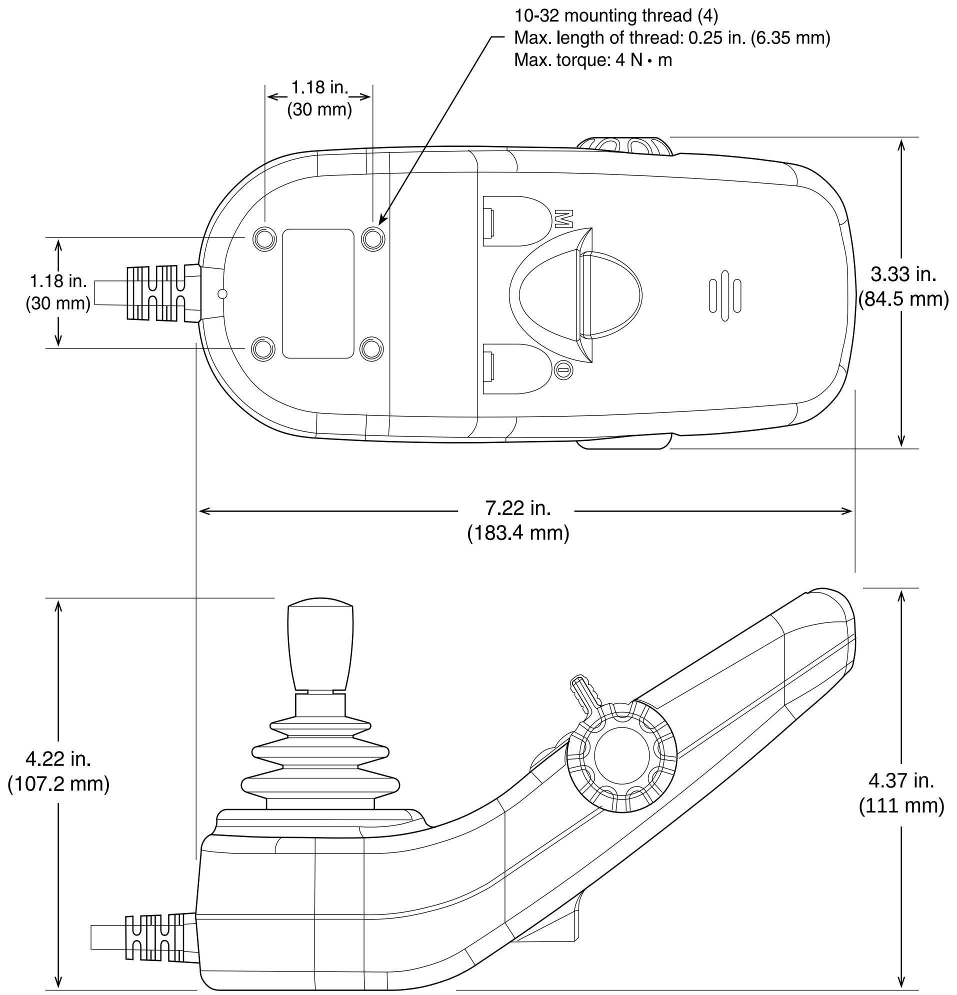

10-32 mounting thread (4)
Max. length of thread: 0.25 in. (6.35 mm)
Max. torque: 4 N • m
1.18 in.
(30 mm)
1.18 in.
(30 mm)
3.33 in.
(84.5 mm)
7.22 in.
(183.4 mm)
4.22 in.
(107.2 mm)
4.37 in.
(111 mm)

Figure 23. Q-Logic Hand Control Dimensions

Q-Logic Enhanced Display

The Enhanced Display is mounted to the display mounting bracket with three bolts. A programmer/charger port is located at the back of the module, as are two parallel jacks for remote Mode and On/Off switches. The 1 meter flying lead ends in a Molex 6-pin BUS connector.

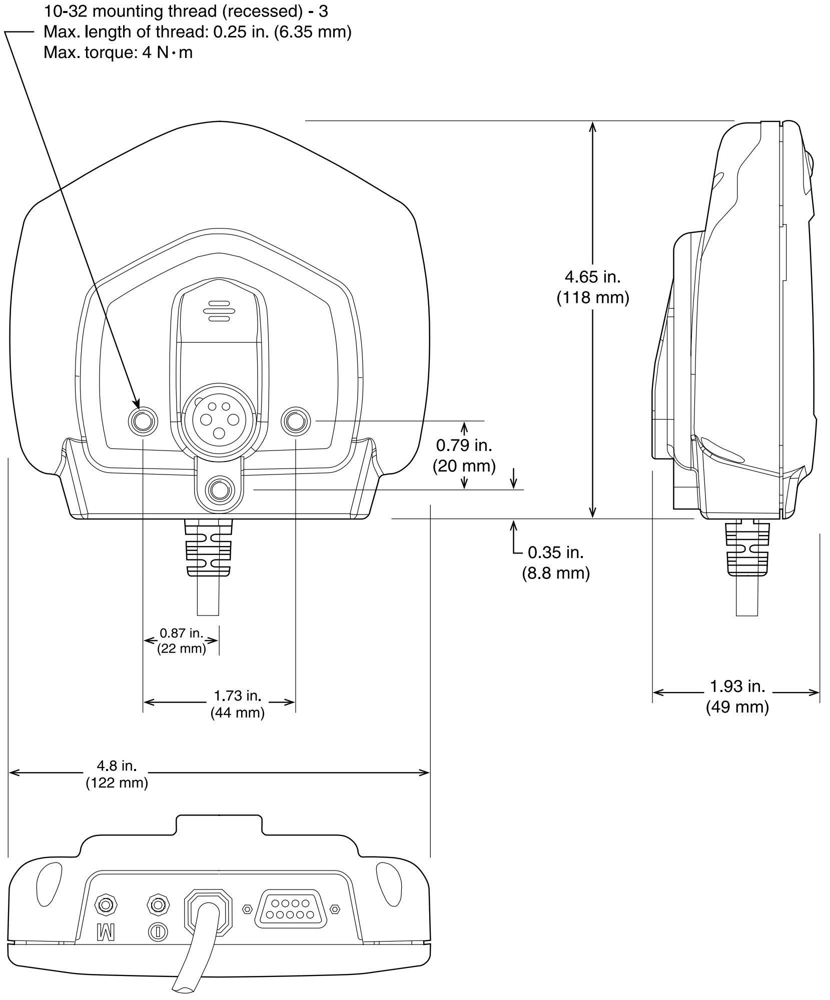

10-32 mounting thread (recessed) - 3
Max. length of thread: 0.25 in. (6.35 mm)
Max. torque: 4 N·m
4.65 in. (118 mm)
0.79 in. (20 mm)
0.35 in. (8.8 mm)
0.87 in. (22 mm)
1.73 in. (44 mm)
1.93 in. (49 mm)
4.8 in. (122 mm)
M

Figure 24. Q-Logic Enhanced Display Dimensions

Q-Logic Off-board Charger/Programming Port

The off-board charger/programming port on the hand control, Enhanced Display, and charger harness is pin-to-pin mechanically and electrically compatible with the industry standard 3-pin XLR; continuous rating on fused B+ and B- is 13 amps. The port also has two smaller pins for communication with a programmer.

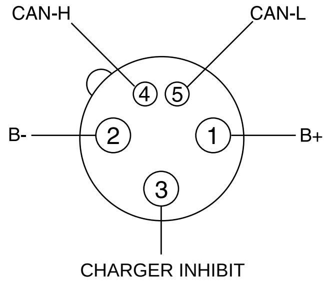

CAN-H
CAN-L
4
5
B-
2
1
B+
3
CHARGER INHIBIT

Figure 25. Off-board Charger/Programming Port

Stand-alone Joystick (SAJ)/Attendant Control

The SAJ/Attendant Control is mounted to the mounting bracket with two bolts. Two parallel jacks for remote Mode and On/Off switches are located on the underside of the module. The 1 meter flying lead ends in a Molex 6-pin BUS connector.

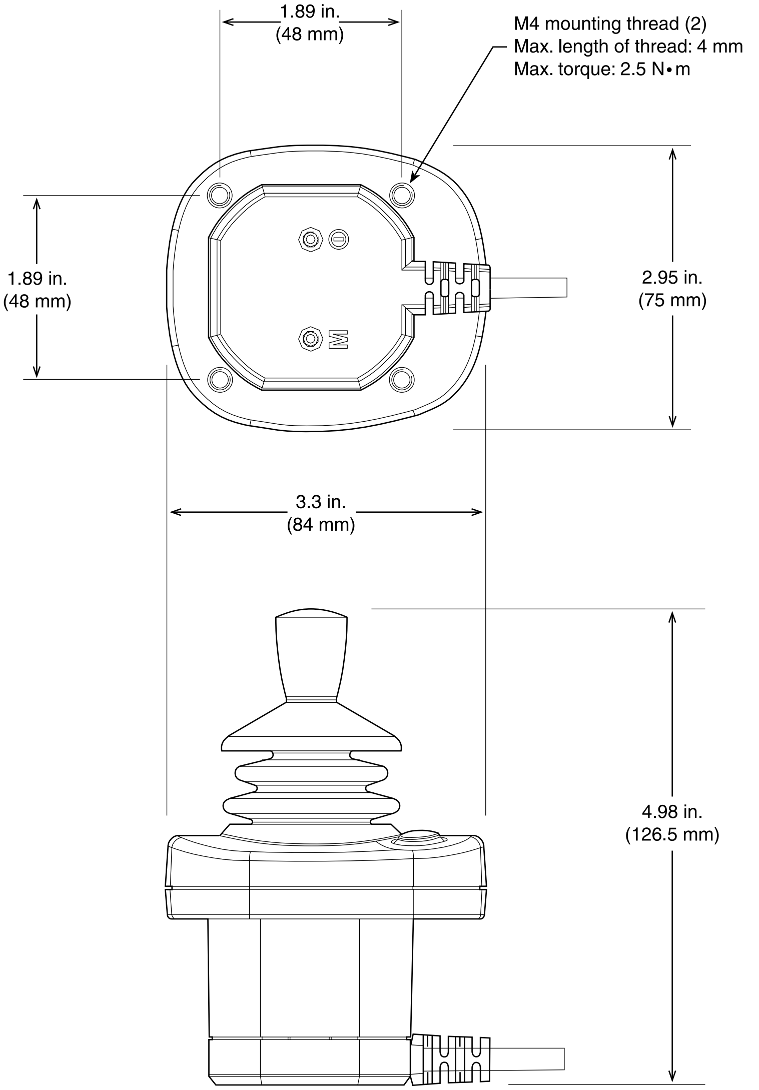

1.89 in.
(48 mm)
M4 mounting thread (2)
Max. length of thread: 4 mm
Max. torque: 2.5 N•m
1.89 in.
(48 mm)
2.95 in.
(75 mm)
M
3.3 in.
(84 mm)
4.98 in.
(126.5 mm)

Figure 26. SAJ/Attendant Control Dimensions

Sip & Puff

The Sip & Puff is mounted to the seatback with two bolts. The Sip & Puff can be oriented in any position, but the location should be carefully chosen to keep the module as clean and dry as possible. One end of the unit has the connector for the air hose and two BUS connectors, one of which is covered. Always run the air hose below the module. The BUS connection is made with a custom CONXALL connector; make sure the ring of the BUS connector is locked properly.

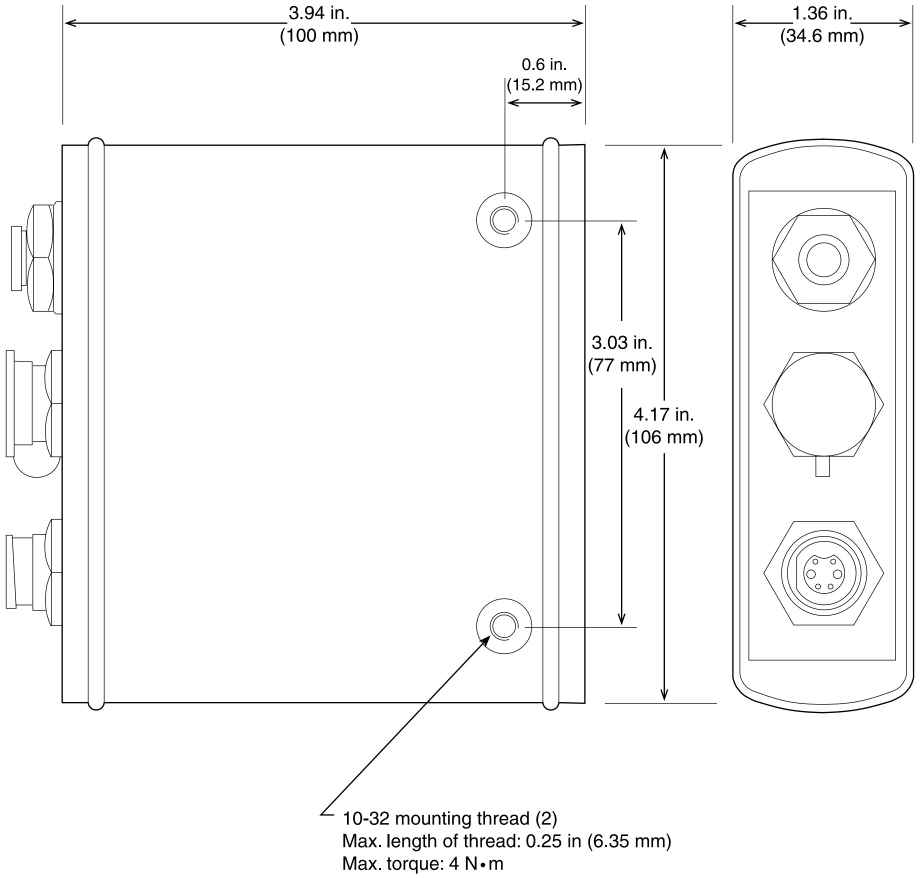

3.94 in.
(100 mm)
0.6 in.
(15.2 mm)
1.36 in.
(34.6 mm)
3.03 in.
(77 mm)
4.17 in.
(106 mm)
10-32 mounting thread (2)
Max. length of thread: 0.25 in (6.35 mm)
Max. torque: 4 N•m

Figure 27. Sip & Puff Dimensions

REMOTE CONTROL

The Q-Logic system can run the user's electronic devices (TV, radio, door openers, lights) by remote control, through the Aux menu. It does this by using the IR built into the Enhanced Display. This IR can be programmed with the unique IR codes embedded in the user's individual remote controls.

The process has three main steps:

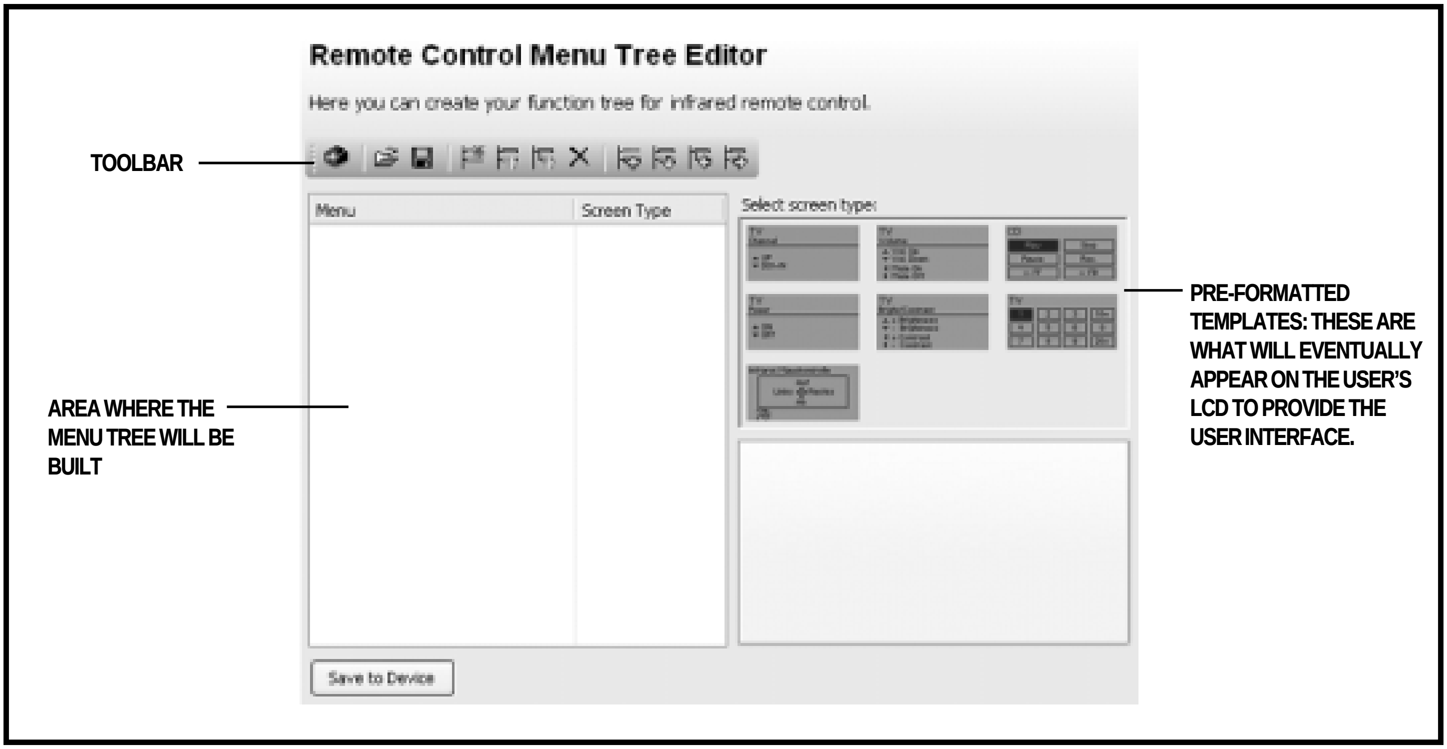
- First, a user-specific menu tree is built. The menu tree is simply a matrix with "pigeonholes" (or "placeholders") for all the IR codes that will be copied.
- Second, the completed menu tree is downloaded to the Enhanced Display as an IR Menu Configuration file.
- Third, the Enhanced Display is taught the actual codes that fit into the matrix.

The PCPS is used to build the menu tree and download it to the Enhanced Display. The Enhanced Display then learns the codes directly from the user's remote control devices, without the PCPS.

Building the Menu Tree

First, the Q-Logic system must be connected to the computer. The software to build the menu tree resides in the system, not in the PCPS. To begin building the menu tree, click on the menu item IR Menu Tree Editor to start the editor (Enhanced Display — Remote Control menu).

If this is the first time the editor has been used, it will open with an initial screen as shown in figure 28.



Remote Control Menu Tree Editor

Here you can create your function tree for infrared remote control.

TOOLBAR

AREA WHERE THE MENU TREE WILL BE BUILT

PRE-FORMATTED TEMPLATES: THESE ARE WHAT WILL EVENTUALLY APPEAR ON THE USER'S LCD TO PROVIDE THE USER INTERFACE.

Figure 28. Initial Screen

To build the tree, the functions from the toolbar at the top of the screen will be used. See figure 29.

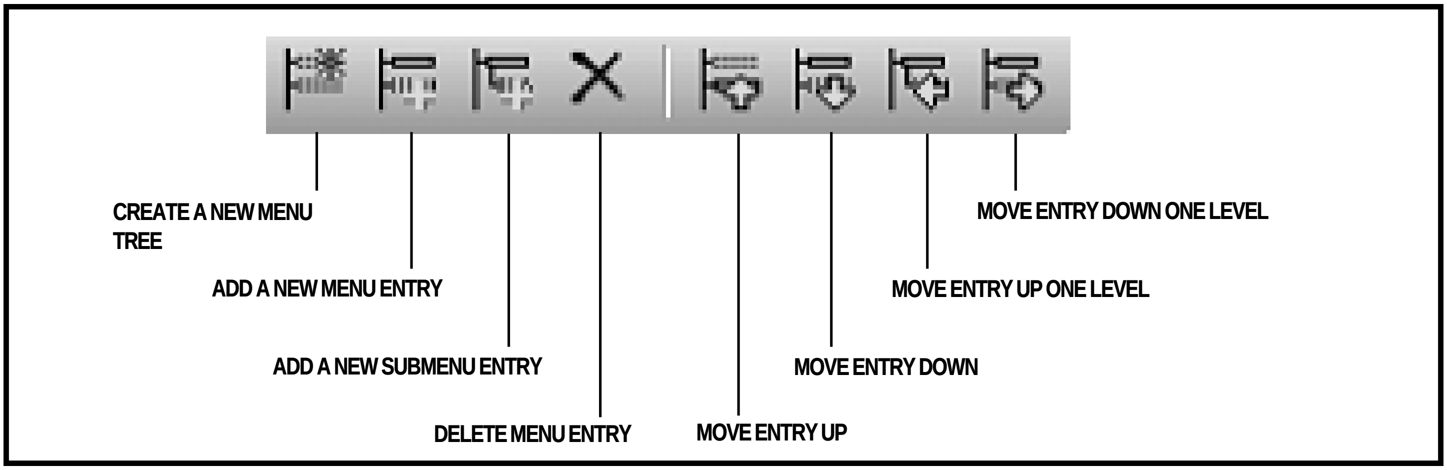

CREATE A NEW MENU TREE
ADD A NEW MENU ENTRY
ADD A NEW SUBMENU ENTRY
DELETE MENU ENTRY
MOVE ENTRY UP
MOVE ENTRY DOWN
MOVE ENTRY UP ONE LEVEL
MOVE ENTRY DOWN ONE LEVEL

Figure 29. Initial Screen Toolbar

Click on “Create a new menu tree,” and then on “Add a new menu entry.” After adding a few menu entries and shifting some to the right to get submenus (“Move entry down one level”), the tree might look like figure 30. The menu hierarchy can have only four levels. However, an unlimited number of items are allowed at any level.

Add Labels: New items appear as “<New Menu>” in the tree. To edit this text, right-click the mouse and select “Rename.” The appropriate text can then be entered as shown in figure 31.

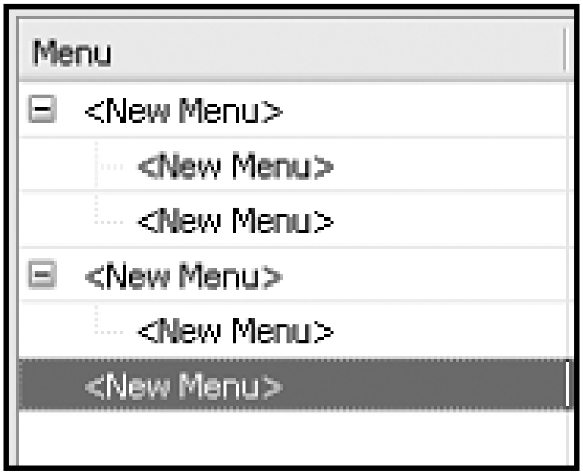


Figure 30. New Menu Screen

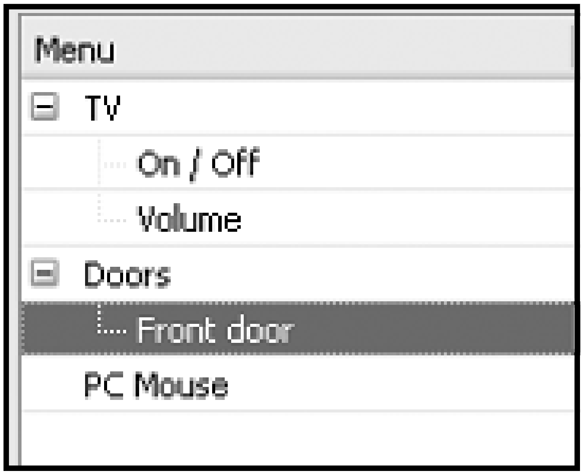
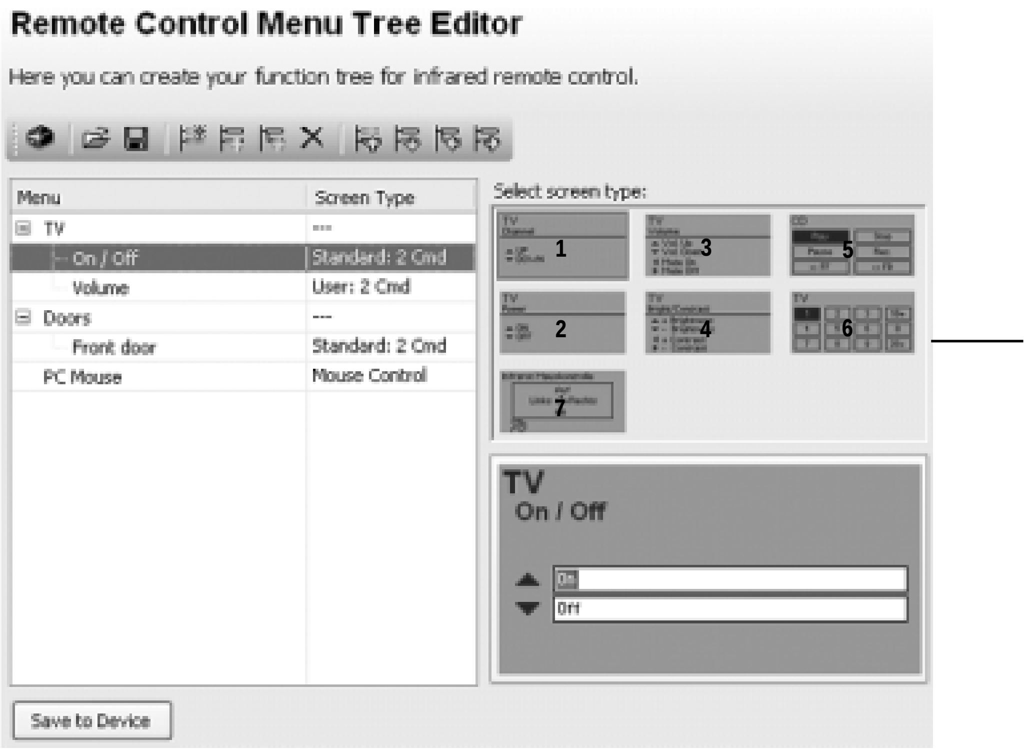

Menu
TV
On / Off
Volume
Doors
Front door
PC Mouse

Figure 31. Adding Labels

Assign Screen Templates: Next, templates will need to be selected for the various groups of functions in the menu tree. Six screen templates are provided: two with 2 commands, two with 4 commands, one with 6 commands and one with 12 commands. Click on a menu item and then on the appropriate template. The name of the screen type will appear in the "Screen Type" column, and the screen itself will appear in the lower right corner. In this example, the Standard 2-Command screen was selected for the TV On/Off menu item. See figure 32.



Remote Control Menu Tree Editor

Here you can create your function tree for infrared remote control.

Menu	Screen Type
⊟ TV	---
On / Off	Standard: 2 Cmd
Volume	User: 2 Cmd
⊟ Doors	---
Front door	Standard: 2 Cmd
PC Mouse	Mouse Control

Select screen type:

TV
On / Off

On
Off

Save to Device

1 STANDARD: 2 CMD
2 USER: 2 CMD
3 STANDARD: 4 CMD
4 USER: 4 CMD
5 KEYFIELD: 6 BTN
6 KEYFIELD: 12 BTN
7 MOUSE CONTROL

Figure 32. Selecting Templates

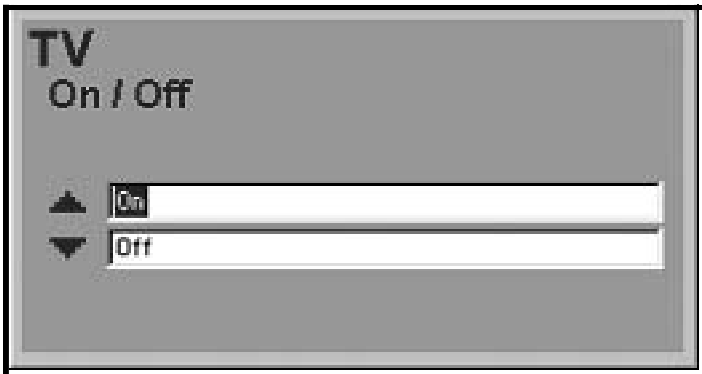
The screens being created are the screens that will appear on the user's LCD when they are operating in Aux mode. The labels on the screen ("TV" and "On/Off") are automatically entered from the menu tree. The specific function (On/Off, in this case) becomes the subtitle, and the item one level above it in the menu (TV, in this case) becomes the title.

Sometimes users may want to be able to edit the screen labels. The User 2-Command and User 4-Command templates allow this to be done by having editable text fields. This can be useful when the menu item two levels above the function would be a more appropriate title than the item one level above. Or, the user may simply want a more descriptive title.

On all the other screens, the title and subtitle text are taken directly from the menu tree, and cannot be edited.

The seventh screen template is the mouse screen. Selecting this screen adds mouse control functionality.

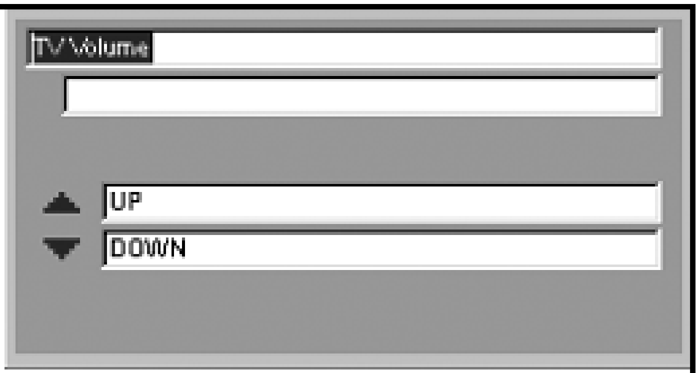
The six screen templates are shown in figure 33.



TV
On / Off

On
Off

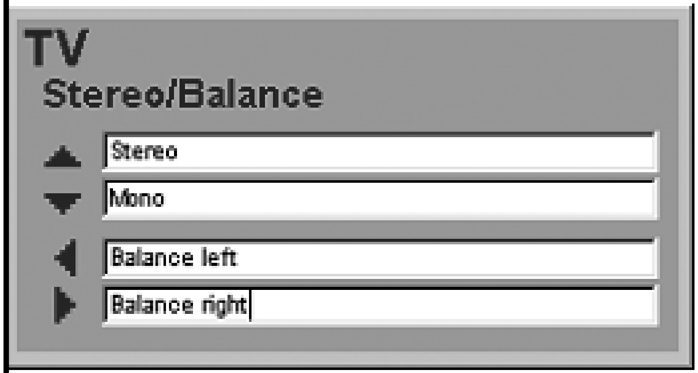
STANDARD 2-COMMAND



TV Volume

UP
DOWN

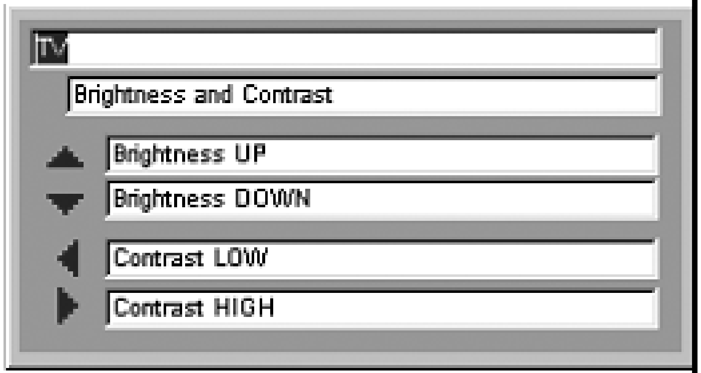
USER 2-COMMAND



TV
Stereo/Balance

Stereo
Mono
Balance left
Balance right

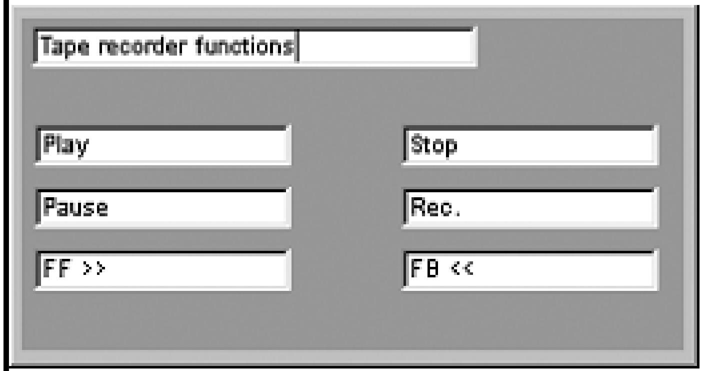
STANDARD 4-COMMAND



TV
Brightness and Contrast

Brightness UP
Brightness DOWN
Contrast LOW
Contrast HIGH

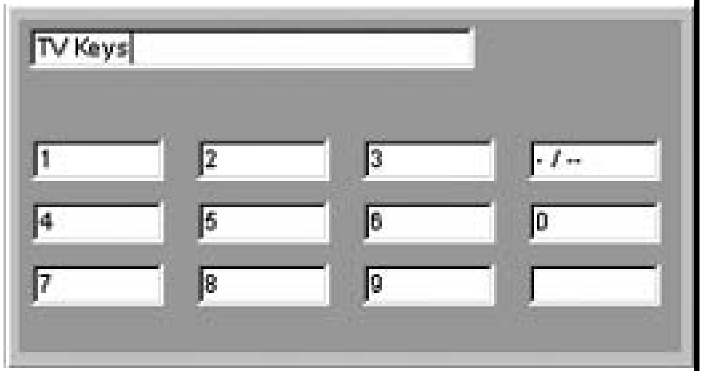
USER 4-COMMAND



Tape recorder functions

Play
Stop
Pause
Rec.
FF >>
FB <<

KEYFIELD 6-BUTTON



TV Keys

1
2
3
- / --
4
5
6
0
7
8
9

KEYFIELD 12-BUTTON

Figure 33. Screen Templates

NOTE: It is not necessary to fill all the fields. Three commands can be placed in a 4-command template, or only seven in a 12-button template.

Downloading the Menu Tree

When the whole menu tree has been built and assigned to screen templates, the entire configuration can be downloaded to the Enhanced Display. This is accomplished by pressing either the “Save to Device” button at the bottom of the Editor screen, or the download icon at the far left of the toolbar.

While the data is being written to the Enhanced Display, the whole system will be set into idle mode. When the write is complete and the system power cycled, the defined menu tree will be available on the Enhanced Display. The whole tree will appear as a subtree of the AUX menu item “Remote Control.”

In the event that the menu tree together with all the related screen templates and labels exceeds the memory size reserved for this information on the target Enhanced Display, the download will fail and an error message will appear on the PCPS. Some functions will need to be dropped in order to reduce the file to an acceptable size.

Saving the Menu Tree to File

The complete menu tree can also be saved to a file by clicking on the floppy disk icon in the toolbar. The file extension “IRM” is added to an IR menu configuration file.

It may be more convenient to save a few different trees to be used as templates, so that new menu entries will not have to be created and labeled. It is much quicker to make a few changes to an existing menu tree than to start from scratch each time.

A copy of each user's menu tree should also be saved as a temporary backup. However, once the IR codes have been learned, the backup will need to include the codes as well.

LEARNING IR CODES

Once the menu tree has been downloaded to the Enhanced Display, the PCPS is no longer needed. The Enhanced Display learns the IR codes directly from the user’s remote controls.

To ensure optimal learning, the following conditions need to be observed:

- Make sure the remote control unit has new batteries. This will guarantee it gives a good quality IR signal.
- Position the remote control and the Enhanced Display as shown in figure 34. When pressing a key on the remote control, make sure the unit does not move; you may find it helpful to rest the remote control on a table or other hard surface. The distance between the remote control and the Enhanced Display should be between 4–10 centimeters.

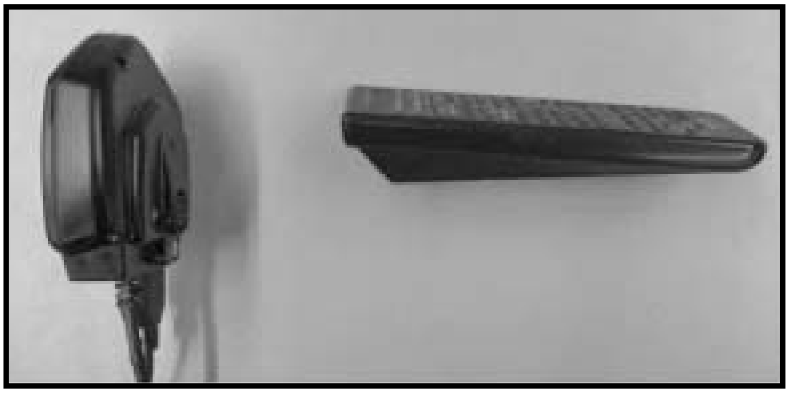


Figure 34. Device Positioning

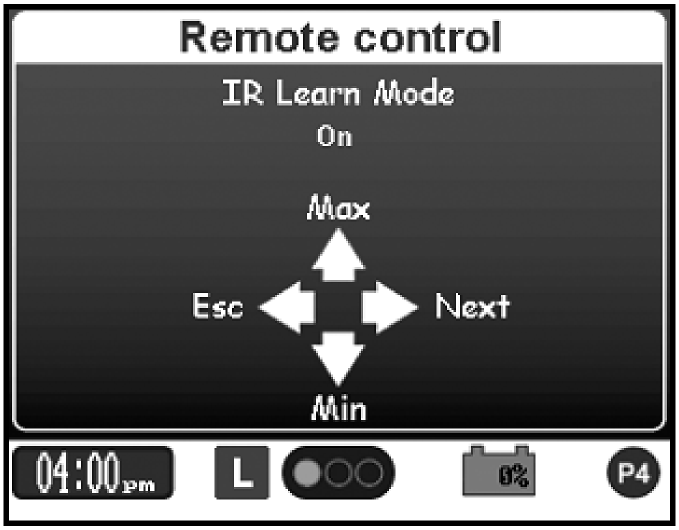
Entering Learn Mode: First, the IR Learn Mode parameter will need to be set to On (Enhanced Display — Remote Control menu). A small icon with the letter "L" will appear in the status line at the bottom of the LCD, indicating that learn mode is active. See figure 35.

Next, the function the Enhanced Display has to learn needs to be selected. The menu tree built previously is now a subtree in the Enhanced Display's Aux menu. As an example, the TV Volume up and down functions could be selected by clicking on the menu tree item "Remote Control — TV — Volume, and this screen will appear. See figure 36.

Select the "up" command to start the learning procedure for this command. Follow the steps as they appear on the screen. For this function, the type of IR code will be "Simple." The screen will prompt the user to press and hold the TV remote control's Up button. When prompted to release the button, do so immediately. In addition to the screen prompt, the Enhanced Display will beep when it is time to release the button. After the code has been learned, there will be an opportunity to tune the signal's carrier frequency and the number of repetitions. Most users will accept the default values and click OK on the tuning screen. Finally, the newly learned code is saved by clicking "OK." The Enhanced Display has now learned the TV Volume Up code.

The red Xs on the screen indicate empty slots - i.e., the code has not been learned for these functions. After learning the TV Volume Up code, the screen will look like that shown in figure 37.

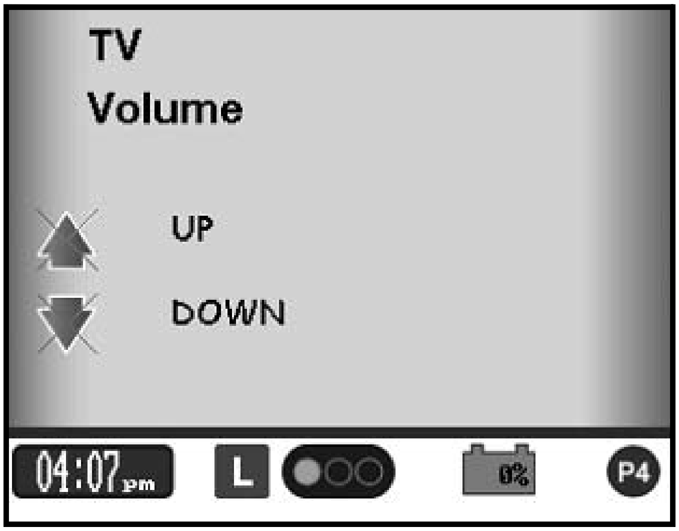
When a code has been learned, it does not have to be permanent. A new IR code can be learned for any key at any time, replacing the earlier learned code.


Remote control

IR Learn Mode

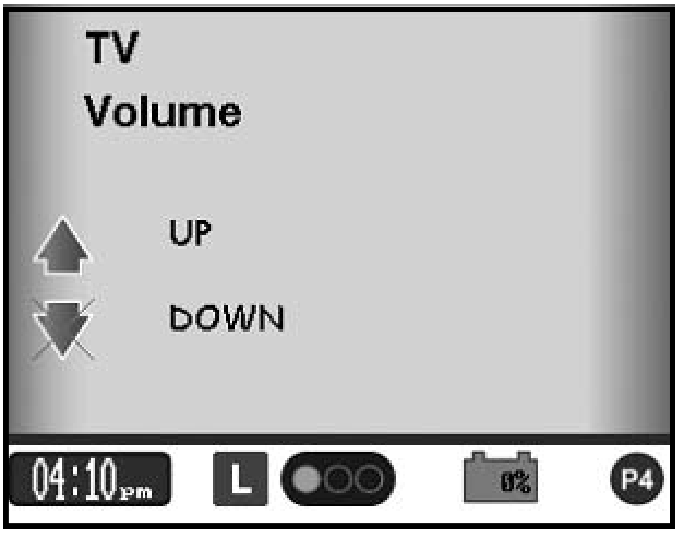
On

Figure 35. Learn Mode Screen


TV

Volume

Figure 36. TV Volume Screen


TV

Volume

Figure 37. TV Volume Screen - Up Code Learned

Some codes consist of multiple parts. For example, TV channel 146 will require learning 1 and 4 and 6. In the screen prompting the user to select the type of IR code, the options are Simple, Dual, and Triple. For channel 146, Triple would be selected, then the user would follow the prompts to hold and release the 1 button, the 4 button, and the 6 button.

Exiting Learn Mode: In order to use the learned IR codes, the user must exit the IR Learn Mode. This is accomplished by either setting the IR Learn Mode parameter to Off (Enhanced Display — Remote Control menu) or by cycling the power.

Using Learned Codes

To enter an IR screen via the Enhanced Display's Aux menu, the Right or Select command is used. To exit an IR screen, the Mode command is used.

IR screens with 6 or 12 keys (as well as all learn screens) require five commands for navigation: left, right, up, down, and "select." Navigation can be done in one of two ways, depending on the setting of the Keyfield 3 Direction Select Forward parameter (Enhanced Display — Remote Control menu):

1. Keyfield 3 Direction Select Forward = Off
   With this parameter setting, navigation in all four directions is possible with the four directional commands. The external switch that is also used for the left mouse button must be connected to provide the "Select" command.
2. Keyfield 3 Direction Select Forward = On
   With this parameter setting, navigation in all four directions is possible using only the left, right, and down commands. There is no up command in the menu. To get to an item that is higher in the menu, the down command must be used repeatedly. When the cursor is on the bottom line, giving another down command makes the cursor jump to the top line. The unused up command acts as the "Select" command. The external switch (left mouse button) can also be used for "Select."

Modifying Learned Codes

Learned IR codes are bound to specific menu entries. Later modification of the menu tree is possible, but it must be done carefully, to avoid losing codes inadvertently.

Using the PCPS's Menu Tree Editor allows the user to:

- Move a specific menu entry within the whole tree, by using the special keys on the toolbar. The learned IR code will move with the menu entry.
- Rename the label of a menu entry as well as each label on a detail screen, without loss of learned IR code.
- Remove a menu entry using the "X" button on the toolbar. When this command is used, all learned IR codes attached to keys of that screen will be lost.
- Replace a specific screen template with another one. When this command is used, even if the new template is of the same type, all learned IR codes and all user-definable labels are lost.
- Restore a whole menu tree from file, using the File button on the toolbar. When this command is used, all learned IR codes are lost, even if the same tree you started with is being used. This is because when a menu tree is saved to file, only the structure itself is saved, and not the learned IR codes.

Fortunately, it is possible to save a file that does contain the tree and all its associated codes, which is strongly recommended.

Backup of Menus and Codes

It is a good idea to have a backup of each user’s IR menu together with all its learned codes. If this information is lost, or if a new Enhanced Display is used, this backup will make it easier to restore the user’s data.

To make this backup, the PCPS’s “Save” (or “Save As ...”) function is used to generate a *.CPF file. This file holds the IR menu tree and all the learned IR codes, which the PCPS reads from the Enhanced Display’s memory. (This file also holds all the parameter settings, device information, etc., which the PCPS reads from the power module.)

To restore the backup data, either the PCPS command “Open ...” is used or the user can click on the File icon to open the backup *.CPF file. To download this data to the Enhanced Display, either “Save to Connected System” is selected or the user can click on the Save Program File to Connected System icon at the top of the screen.

MOUSE CONTROL

The Enhanced Display can operate a computer mouse either through IR or Bluetooth remote commands. The parameter Mouse Interface (Enhanced Display > Mouse menu) is used to select the interface.

NOTE: When configuring the IR Menu Tree, an entry has to be made for the mouse in order to be able to select this function on the Enhanced Display. This is necessary regardless of whether the mouse uses an IR or a Bluetooth interface.

Prerequisites - IR Control

To operate the mouse using the Enhanced Display’s IR interface, a GEWA USB IR PC Adapter must be connected to the computer’s USB port. Minimum system requirements: Microsoft Windows® 98 or Mac supporting USB. Make sure that the parameter Mouse ID (Enhanced Display > Mouse menu) matches the ID of the GEWA adapter; the ID is located on the adapter’s back side.

NOTE: The adapter can be ordered directly from GEWA; it is Part No. 6632.

Prerequisites - Bluetooth Control

To operate the mouse using the Enhanced Display’s Bluetooth interface, the computer must also have a Bluetooth interface that supports the HID (Human Interface Device) profile. Windows XP SP2 and Mac OS X both have built-in HID support.

Operating the Mouse

To begin operating the mouse, the “Mouse” command in the Aux menu must be selected. This will prompt the mouse screen to appear. To exit the mouse screen, a Mode command is used.

There are four ways to operate the mouse:

- Mouse switches (left and right mouse buttons)
- Toggle switch
- Toggle switch in Auto mode
- Toggle switch in Hold mode.

The switches (left mouse, right mouse, toggle) are connected to the power module. The toggle switch corresponds to a left mouse button.

In Mouse Switches Mode, the connected right and left mouse switches are used together with the mouse movement commands to achieve full mouse functionality. See figure 38.

In Mouse Toggle Mode, an external switch must be connected to the Enhanced Display in order to be able to toggle between mouse movement and mouse click. This external switch corresponds to the left mouse button; this means the left indicator can be used to do the toggling. As shown on the screen, the four directional commands are being assigned specific click commands. See figure 39.

Mouse Toggle Auto Mode is basically the same as Toggle Mode, except that toggling back and forth between mouse click and mouse move is done automatically after each click command.

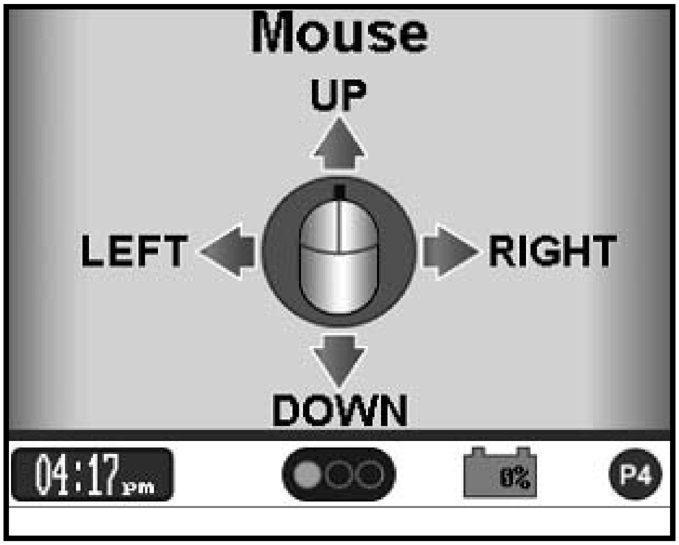

Mouse
UP
LEFT
RIGHT
DOWN
04:17pm
0%
P4

Figure 38. Mouse Switches Mode

Mouse Toggle Hold Mode is also much the same as Toggle Mode, except a mouse click is active as long as the toggle switch is being held down.

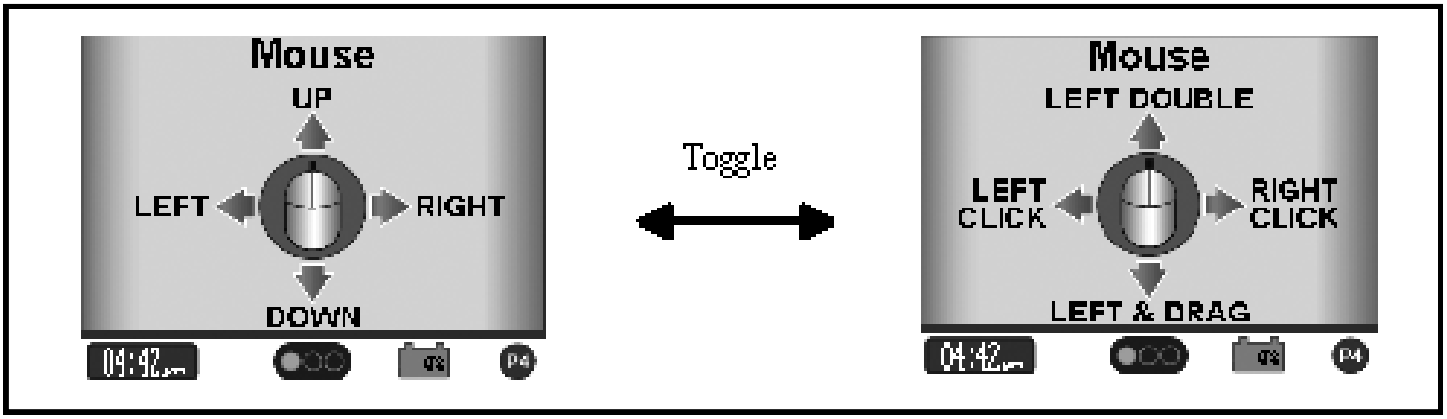

Mouse
UP
LEFT
RIGHT
DOWN
04:42
P4
Toggle
Mouse
LEFT DOUBLE
LEFT CLICK
RIGHT CLICK
LEFT & DRAG
04:42
P4

Figure 39. Mouse Toggle Modes

APPENDIX E

Q-LOGIC FIRMWARE UPDATES

Occasional updates to the Q-Logic Firmware system are necessary to ensure that the user is operating with the most up-to-date system available. This section will detail the procedure to be used to ensure that the Firmware is installed correctly without changes to the drive characteristics.

In order to update the system, the following tools and software files will be needed:

- Start Manager Upgrade CD INFDISC1004
- Curtis CAN-USB INTERFACE (ELEASMB5216) – will include the cable as well as the programming station CD-ROM. See figure 40.
- 1314-3302 CD-ROM
- Firmware .cag files – Available from Quantum Product Support; these files must remain as titled, as changing the file name will cause the programmer not to recognize the file.
  – Powerbase 1750-3509_XXXX.cag
  – Handcontrol 1751-0009_HW4_XXXX.cag or 1751-0009_HW5_XXXX.cag
  – Advanced 1754-6009_XXXX.cag
  – Enhanced Display 1753-2309_XXXX.cag
  – Standalone 1752-1109_XXXX.cag
  – Sip N Puff 1757-0009_XXXX.cag
  – Handheld Dealer 1311-3309_HW4_XXXX.cag
- Latest program .cpf files – Available from Quantum Product Support

Figure 40. Curtis CAN-USB Interface

Follow this procedure to update the Q-Logic Firmware:

1. Copy the new firmware file into the directory where you store all device firmware (for example, a folder labeled New Q-logic Firmware in your My Documents folder. You can also save the .cpf program files in the same folder).
2. Open the Q-logic 1314 PCPS programming station. See figure 41.

By default, the 1314 PCPS searches in the directory "Device Software" of the 1314 PCPS installation directory (e.g., C:\Program Files\Curtis Instruments\1314-3302 PC PROGRAMMING STATION\Device Software). This directory must be added after the PC programming station is installed.

3. Go to Options > Settings > General Settings.
4. Add the firmware folder in the device firmware search path by clicking the "ADD" tab to the right of the search path screen. When the computer's browser screen appears, locate the new firmware folder and save it to the search path. Once set, the PC programming station will automatically look in this folder for new firmware for the system when you are in the "Update Firmware" screen.

NOTE: If you copy the file to a different directory, ensure that the directory is added to the "Device Firmware Search Path" in the settings dialog Options > Settings.

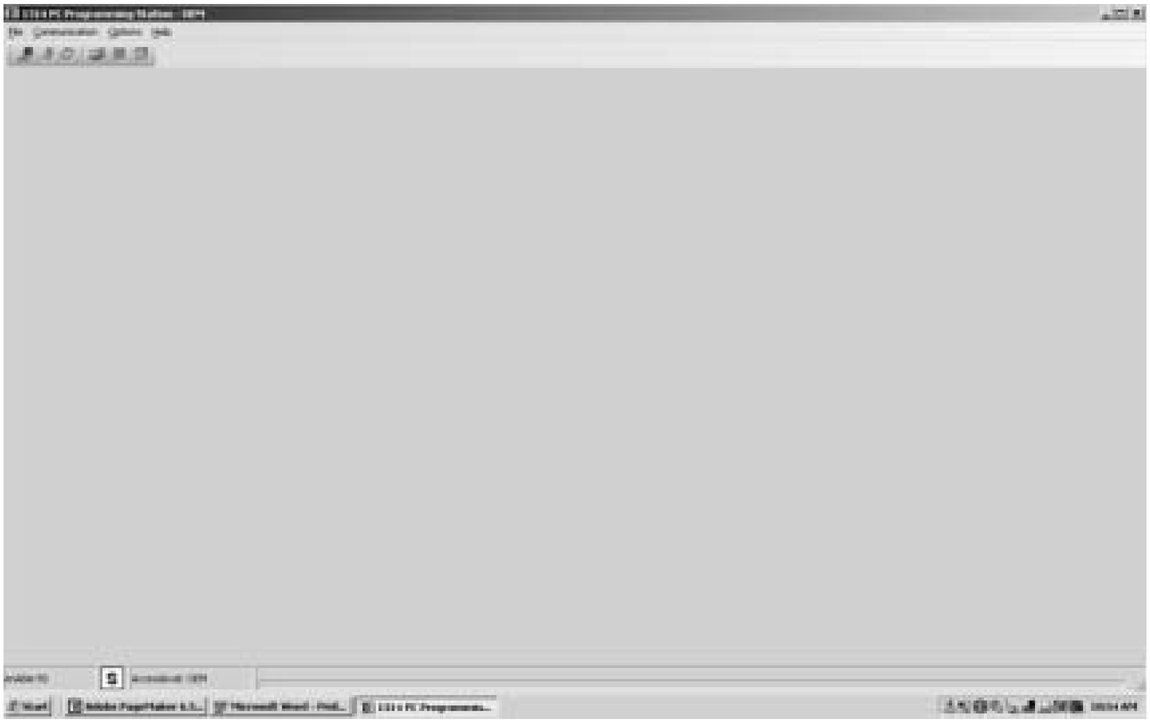


Figure 41. 1314 PCPS Programming Station

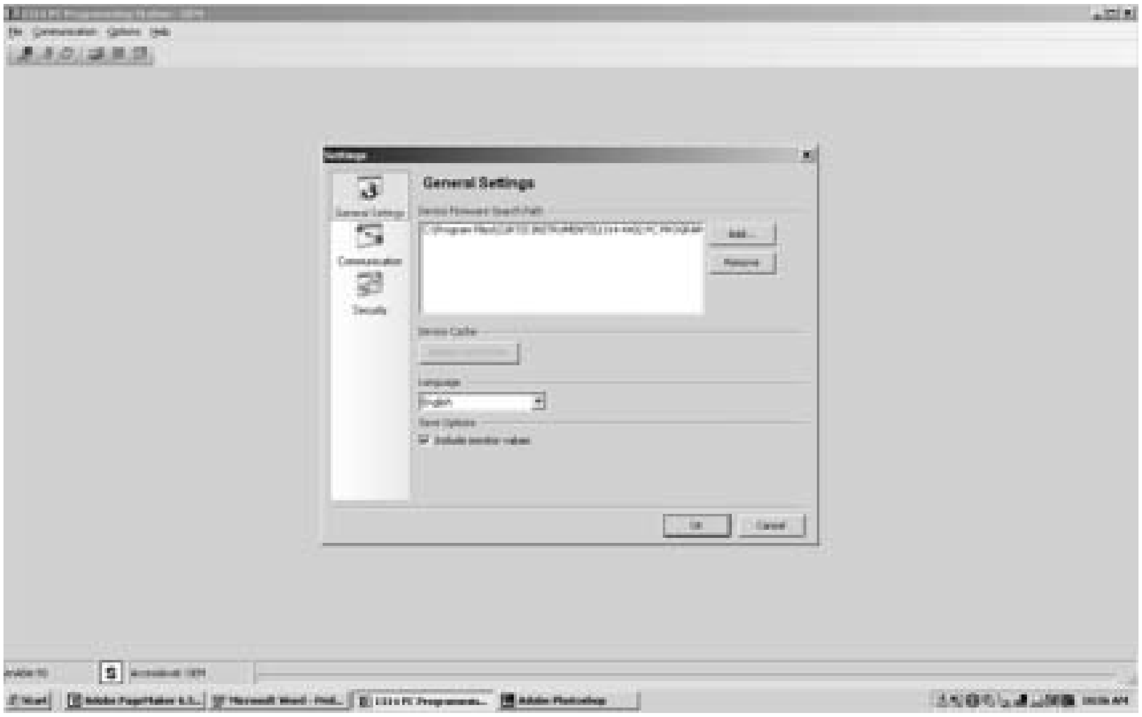

General Settings
Communication
Security
Add...
Remove
OK
Cancel

Figure 42. General Settings Directory

5. Turn the power chair off.
6. Connect the Curtis CAN-USB INTERFACE to the hand control, Enhanced Display, or charger programming harness.
7. Turn the power chair on.
8. Click the F2 key on the PC and the 1314 will start uploading the power chair program. Once loaded, you should see all of the different device modules on the power chair. The firmware update will depend on this list of modules.

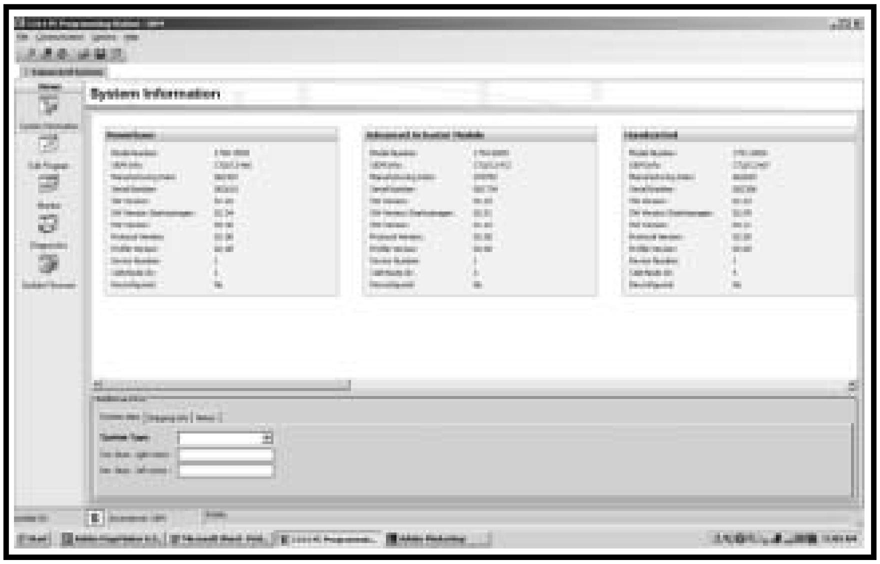


Figure 43. System Information Display Screen

9. Save the power chair's .cpf file so that all drive parameters are not lost.
10. Click on the Update Firmware Icon, located on the left-hand side of the programming station screen, to display the screen below (see figure 44). With the search path correctly installed (steps 3 and 4), the latest firmware contained in the folder will automatically populate in the selected file column.

NOTE: If your search path is installed and the files have populated in the Select File column, proceed to step 12. If the search path is not set in your PC programming station, proceed to the next step to manually enter your firmware files.

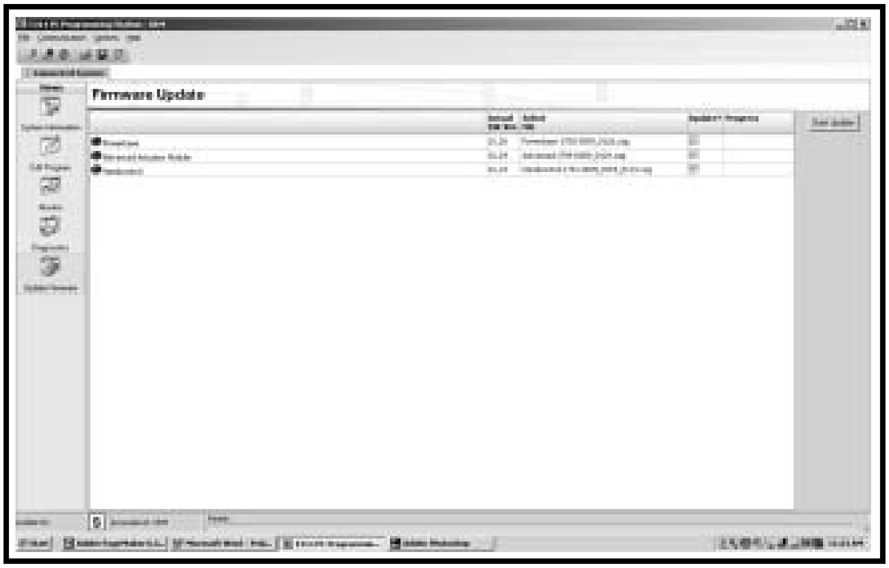


Figure 44. Firmware Update Display Screen

11. If the search path is not set in the PC programming station, manually select the firmware files for each of the modules connected in the system by selecting the “Click here to select file” option. See figure 45.
12. Click on the Choose File option from the drop down box, then choose the needed file from the firmware files directory. The chosen file will automatically populate in the Select File column. Repeat this step for the remaining modules you wish to update.

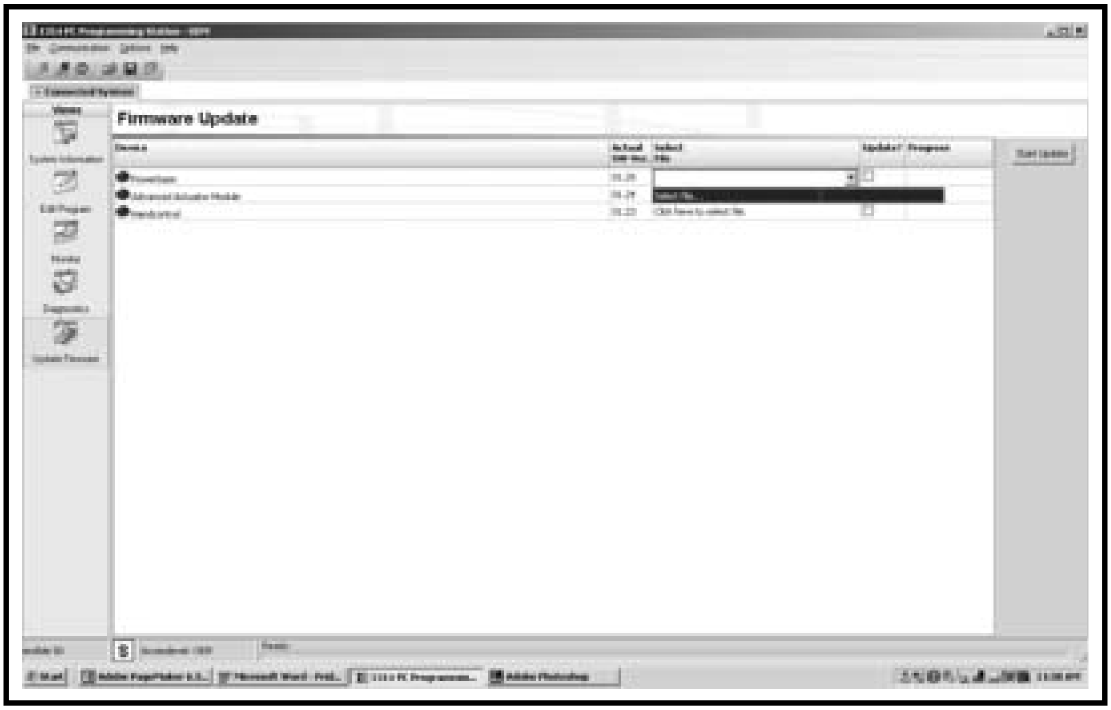


Figure 45. Manual File Select Screen

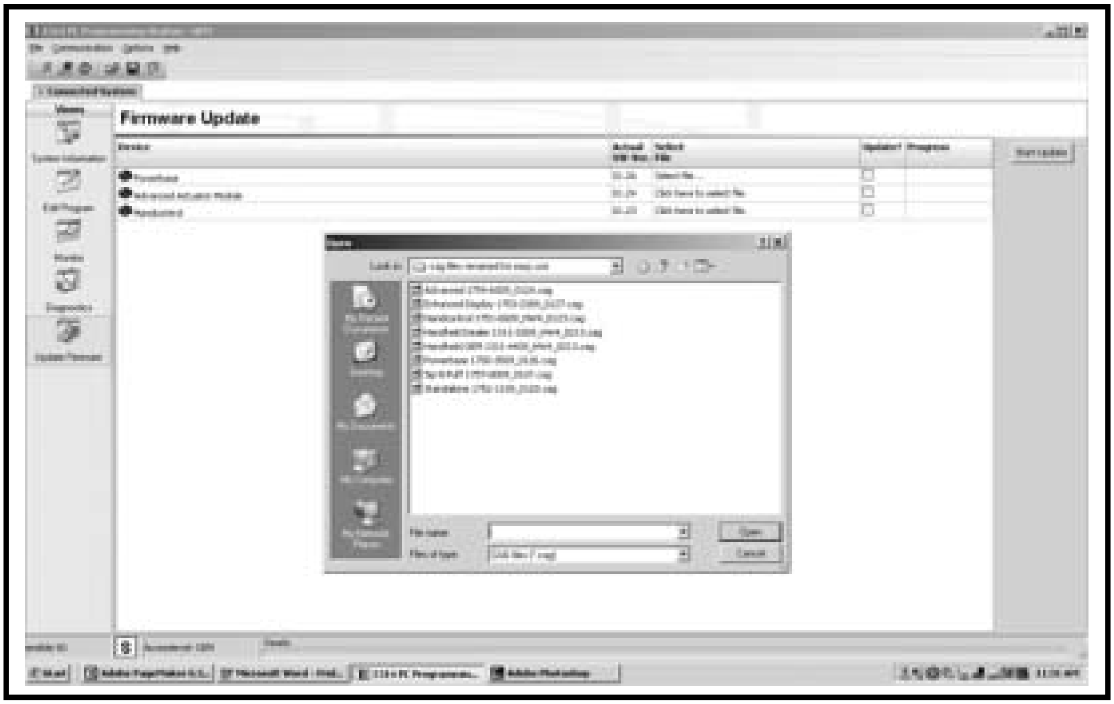


Figure 46. File Selection Drop Down Screen

13. Once all necessary files are selected, make sure that each module scheduled for update is checked.
14. Click on the Start Update Icon in the top right of the screen to begin the firmware update. The progress of the update is illustrated by the blue status bar in the progress chart. See figure 47.

NOTE: Make sure that the display on the power chair flashes IDLE MODE.

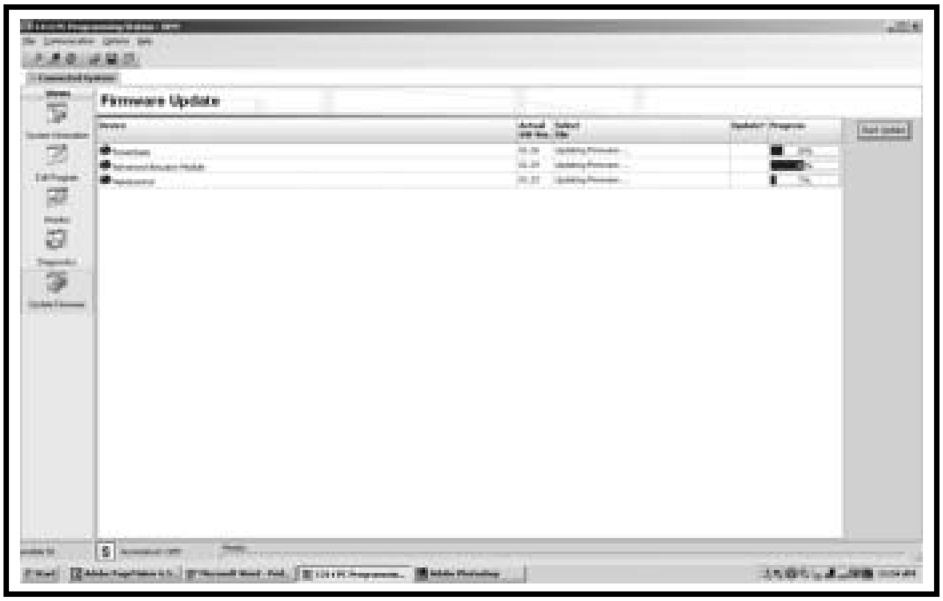


Figure 47. Firmware Update Status Screen

15. When the update is complete, a pop-up screen will appear stating "All updates finished successfully." See figure 48. Click "OK," turn the power chair off for 4 seconds, then turn the power chair back on.

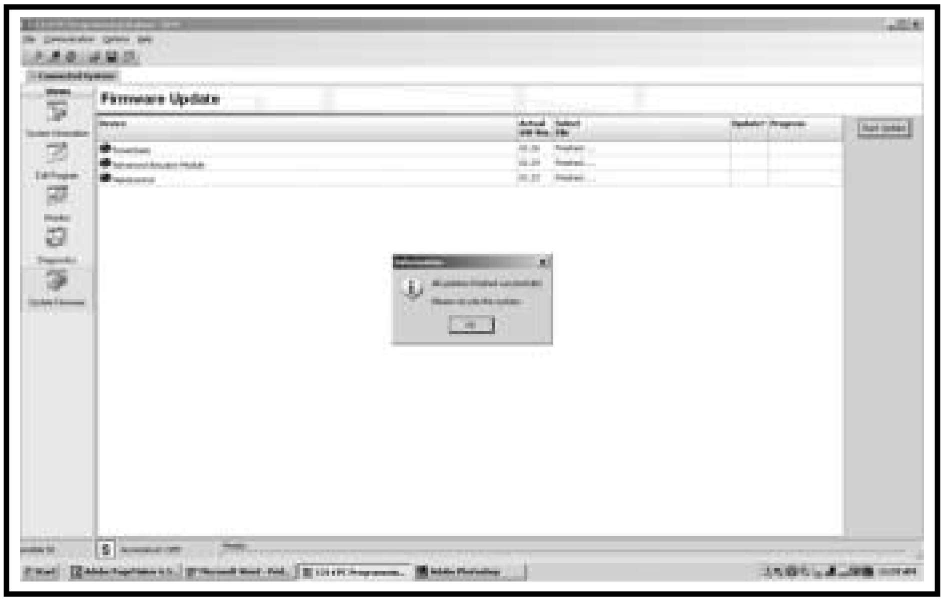


Figure 48. Firmware Update Complete Screen

16. Click the Refresh button in the toolbar or press the F5 key to ensure that all of the modules have been connected.
17. Open the .cpf program file that you saved in step 9.

NOTE: There may be two files—one will be for the power module and the other for the Advanced Actuator Module (if present).

18. Click on the yellow folder icon near the top left of the screen and select the previously saved file. The icon for the power module will be labeled by model number and the icon for the actuator module will be labeled by the configuration number and power functions it will activate. See figure 49.

NOTE: The title of the power module will contain actuators if seating is present.

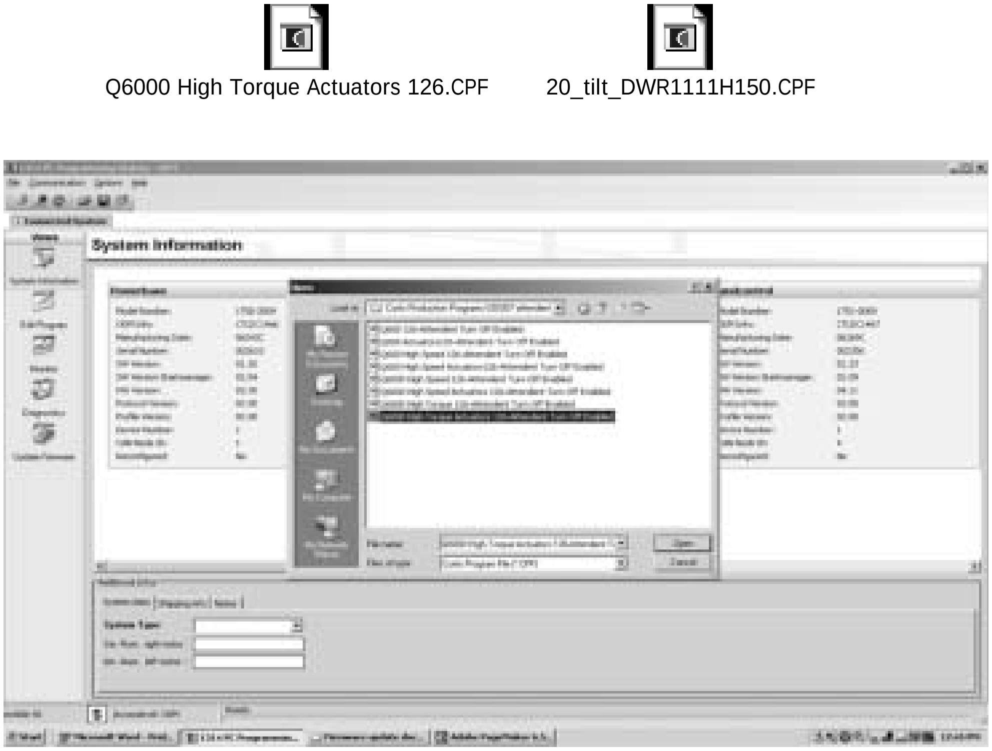


Figure 49. Program (.cpf) Select Screen

19. Select the power module program file to open in the 1314 Programming Station. There will now be two files connected to the system, indicated by the different screen tabs. One will be called Connected System and the other will show the name of the saved program file. See figure 50.
20. Select the saved program tab.

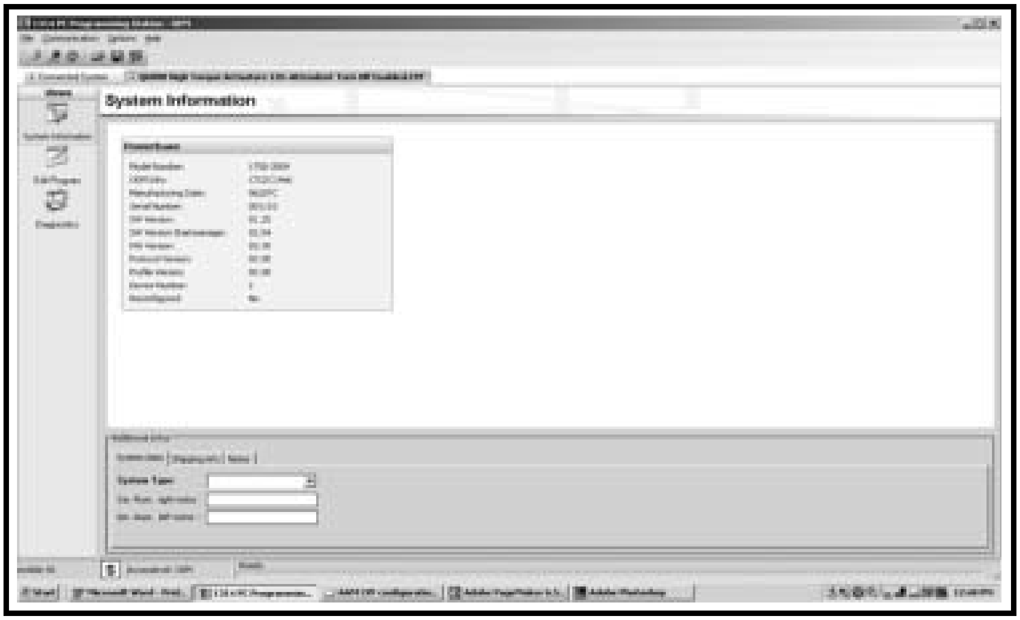


Figure 50. PCPS Program Selection Display Screen

21. Go to Communication > Save to Connected System or press the F6 key to display the Select Devices To Clone screen. See figure 51.

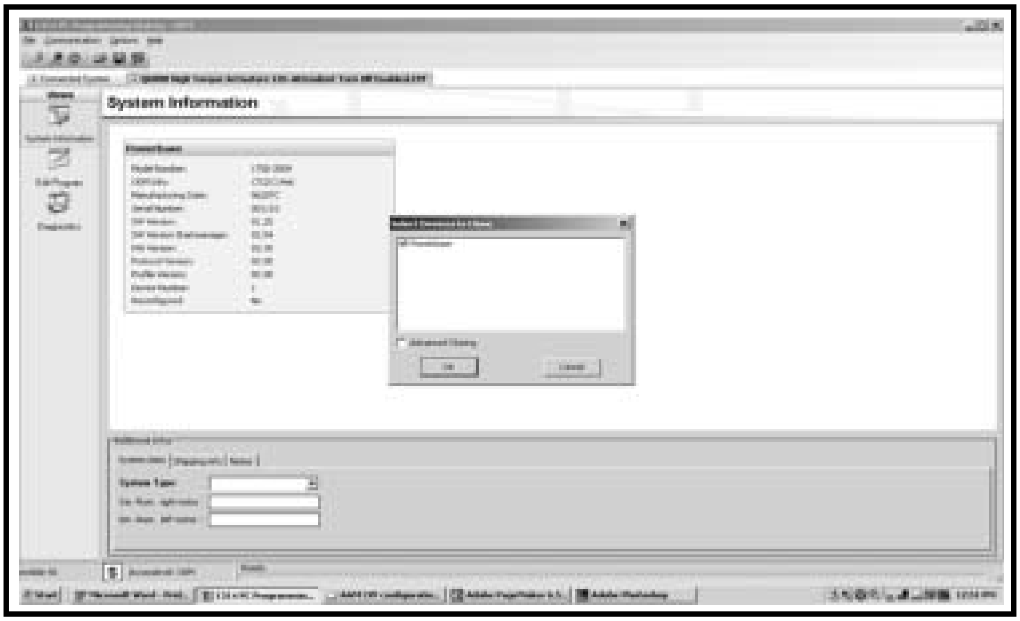


Figure 51. PCPS Program Selection Display Screen

22. Make sure that all boxes are checked in the Select Devices to Clone window, including the Advanced Cloning box. Checking the Advanced Cloning box will produce a pop-up window. See figure 52.

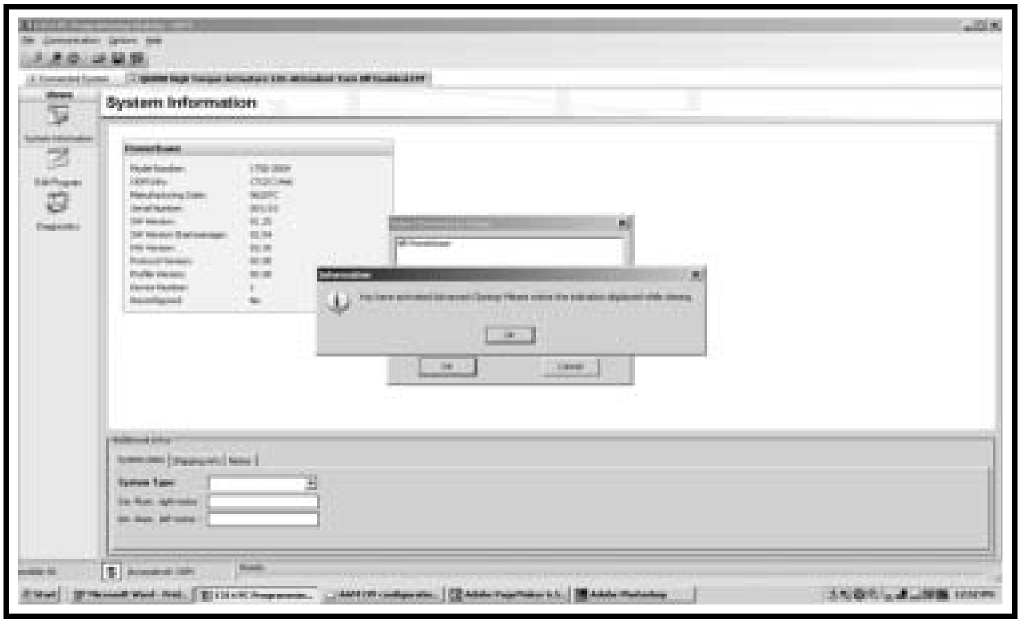


Figure 52. Advanced Cloning Pop-up Window

23. Click OK to receive a caution window regarding over-writing parameters, then click Yes to begin the download, which should last approximately one minute. See figure 53.

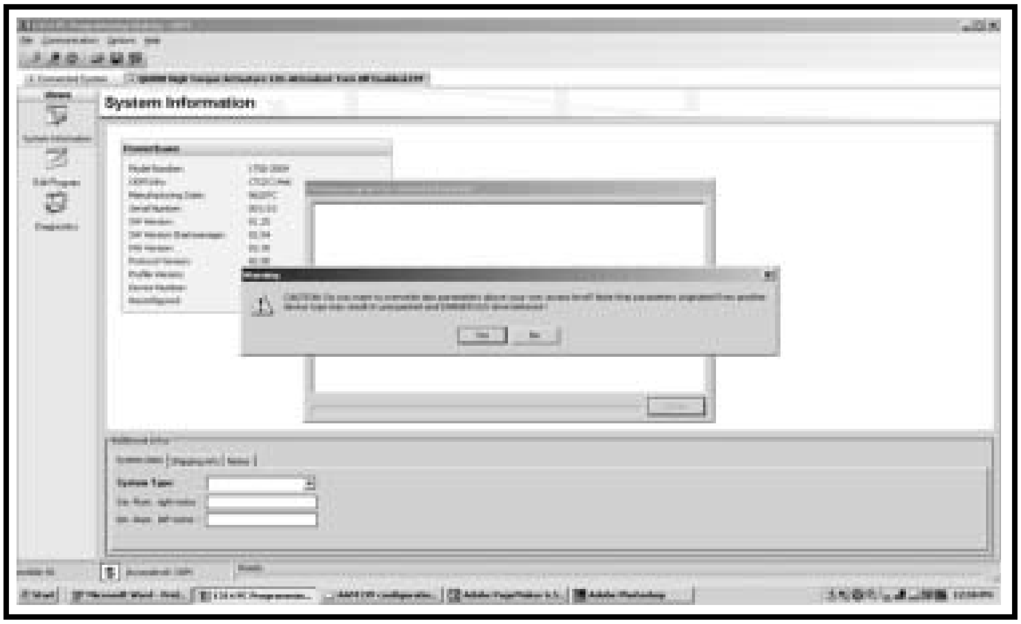


Figure 53. Over-writing Parameters Caution Window

NOTE: Once the download is complete, a report window will appear detailing any warnings or errors that occurred during the download process. See figure 54.

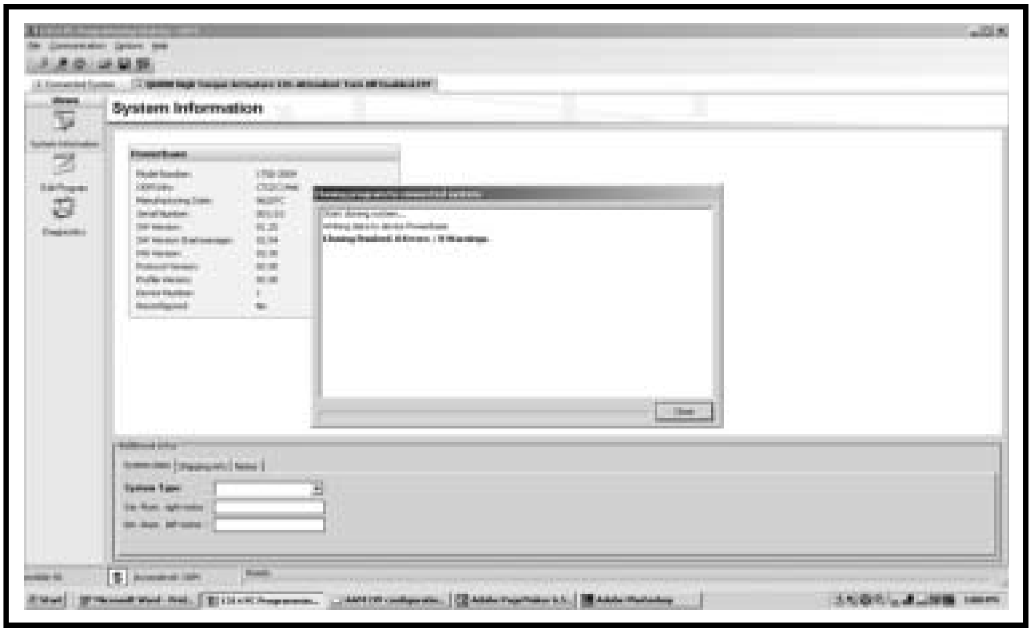


Figure 54. Download Complete Report Window

24. Turn the power chair off for 4 seconds, then turn the power chair back on.
25. Wait until the 1314 PCPS has reconnected to the system. If you encounter problems during automatic refresh, click the Refresh button on the toolbar or press the F5 key to perform a manual refresh. Check the System Overview to ensure that the SW Version of each module has changed to the actual updated version (e.g., power base V1.26).

The Q-Logic firmware update is now complete. Perform a test to ensure the functionality of the power chair, including any actuator or specialty functions. If there are actuator functions such as tilt, repeat the download process beginning with step 14 to add the .cpf file for the Advanced Actuator Module.

N O T E S

N O T E S

Q-Logic
Drive Control System

TECHNICAL MANUAL

Pride
Mobility Products Corp.

QUANTUM
REHAB

Pride Mobility Products Corporation
182 Susquehanna Avenue
Exeter, PA 18643-2694
USA

Pride Mobility Products Company
380 Vansickle Road Unit 350
St. Catharines, Ontario L2R 6P7
Canada

Pride Mobility Products Ltd.
32 Wedgwood Road
Bicester, Oxon OX26 4UL
UK

Pride Mobility Products Australia Pty. Ltd.
21 Healey Road
Dandenong, 3175
Victoria, Australia

Pride Mobility Products Italia S.r.l.
Via del Progresso - ang. Via del Lavoro
Loc. Prato della Corte
00065-Fiano Romano (RM)

Pride Mobility Products Europe B.V.
Castricummer Werf 26
1901 RW Castricum
The Netherlands

www.pridemobility.com